

# COMPUTERWORLD

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## Medicare Underpaid Due to Coding Errors

BROOKLYN, N.Y. — Improperly coded Medicare claim forms may have cost elderly patients in the New York area as much as \$12.7 million in unreimbursed medical bills last year, according to a study completed by the General Accounting Office (GAO) last week.

According to the report, 65% of patients sampled who had filed claims for surgical procedures were paid less than they had expected, and as many as 13% of claims processed contained coding and data entry errors.

Findings from the GAO study were announced here by Rep. Elizabeth Holtzman (D-N.Y.) who initiated the study last year after receiving a large number of complaints of underpayment from elderly constituents.

The study was conducted in a sixteen-county area in New York state, including Holtzman's Brooklyn, N.Y. congressional district.

The GAO report attributed the underpayment to three key factors: coding errors, lump coding and inaccurately skewed fee schedules.

The report said that, out of 42,000 Brooklyn Medicare beneficiaries, 2,500, or 6%, reported underpayments of \$50 or more during 1974, and 82 people received underpayments of \$400 or more.

The Social Security Administration's Bureau of Health Insurance (BHI) disputed the findings, saying a review of the

(Continued on Page 4)

## Texas School Plan Cuts City Busing

CORPUS CHRISTI, Texas — U.S. District Court Judge Owen D. Cox has selected a particular computer plan for desegregating this city's elementary schools with as little busing as possible [CW, Aug. 6].

Scheduled to go into effect Aug. 24, the plan contains modifications which strengthen its appeal to the people of Corpus Christi while satisfying the 75% to 25% ethnic balance requirements set by the court, according to Dr. Joseph Rupp, county medical examiner. Rupp is one of the laymen who suggested and worked to create the electronically generated plan.

The plan called for the city to be divided up into about 450 grids with approximately 40 children in each two-block area. Programmed to minimize busing, distance bused and distance walked, the IBM 360/65 and 370/158, donated for this project by local industry, singled

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## GAO Report Finds

# Agencies Wasting Federal DP Dollars

By Nancy French

Of the CW Staff

WASHINGTON, D.C. — Many state and local government agencies are wasting DP dollars on federally funded projects, a report of the U.S. General Accounting Office (GAO) has found.

Some agencies are leasing equipment for short periods of time without considering saving money through purchasing; others are excluding certain sources of supply even though these sources offer lower prices; still others are purchasing equipment without exploring shared processing, according to the study.

While federal agencies have encouraged grantees to use DP to help meet program goals, they have failed to establish thorough evaluation procedures to help determine the most cost-effective option, the report said.

The survey covered the DP activities of 33 grantees in eight states representing three federal regions.

### Sharing Not Encouraged

While a circular issued by the Office of Management and Budget (OMB) pointed out advantages of joint equipment use, four of the federal agencies surveyed by the GAO have no formal guidelines encouraging sharing, the report said.

The three that do are the Department of Labor's Manpower Administration, the Department of Justice's Law Enforcement

Assistance Administration (LEAA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA).

While Manpower's policy statement encourages use of centralized systems, in actual practice it has not consistently supported this policy, the report said. It does, however, usually participate in decisions on sharing.

The NHTSA, in contrast, encourages grantees to use existing DP facilities and has joined with other agencies to get such systems operating, the report said.

The LEAA also encourages sharing, the report said, and some state planning agencies are operating grant management in-

formation systems on time-sharing facilities.

However, for criminal justice information systems, grantees are being forced to acquire dedicated systems to interface with the Federal Bureau of Investigation's National Crime Information Center [CW, July 30].

Of the 33 grantees studied by the GAO, only six are sharing, two are in transition to sharing and most of the others have not even explored the advantages of sharing, the report said.

Although the latter group may not have found sharing to be the best choice, grantees should have had documentation

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## DP-Set Postal Route Standards Threaten Contract Ratification

By Patrick Ward

Of the CW Staff

BOSTON — Enough U.S. Postal Service employees are still uneasy about computerized setting of route standards to threaten ratification of their union's recent contract with the Postal Service.

The Postal Service's experimental Letter Carrier Route Evaluation System, known as the Kokomo Plan, has previously

drawn union fire as a "threat of robotization" because it can set up letter carrier routes with a specific level of physical effort [CW, Feb. 12].

The July 21 contract offers "no adequate protection for the carriers" in the work standards and productivity area, according to Michael O'Connor, secretary/treasurer of Local 34 of the National Association of Letter Carriers (Nalc).

The contract allows the Postal Service to test the Kokomo Plan and other measures in various U.S. cities after discussion with the union. However, a "memorandum of understanding" in the contract prevents the Postal Service from implementing such a program nationwide without independent arbitration between it and the union.

Some Postal Service employees feel the contract leaves too wide an opening here for such productivity-oriented measures as the Kokomo Plan.

### Considerable Opposition

O'Connor said his local was planning a demonstration against ratification of the contract. He added that he knew of considerable opposition to the contract in

(Continued on Page 2)

## Calcomp Fixed-Disk System Costs 20% Less Than IBM 3350 Unit

By Patrick Ward

Of the CW Staff

ANAHEIM, Calif. — California Computer Products, Inc. (Calcomp) has announced a 400M byte/spindle fixed-disk system whose cost per Mbyte of storage is said to be 15% to 20% below the 317M-byte IBM 3350 [CW, July 23].

IBM had announced the 3350's cost per Mbyte of storage as 50% to 70% below IBM 3330 figures.

Calcomp is leading the independents in picking up the IBM cost-per-storage gauntlet, a Calcomp spokesman remarked. An Intel Corp. spokesman also said his firm plans to announce a 3350 competitor in a few weeks.

Calcomp's Model 1035-235-4 fixed-disk drive will employ 700 track/in. recording density, about twice that used on the 3330-11 or Calcomp's 3330-11 equivalent.

### Software Transparency

The Calcomp drive will retain software transparency with the 3330 since "the user's operating system will look at the single 400M-byte Calcomp spindle as if it were two 3330-11 spindles," a Calcomp spokesman said.

Each two-spindle 235-4 cabinet will contain the equivalent of four 200M-byte 3330-11 spindles as far as the operating system is concerned, he added.

By contrast, IBM's 3350 can provide its full 317M-byte capacity only if the user reformats. It can, however, provide

200M-byte capacity on a 3330 controller without reformatting.

The 235-4 has the same linear bit density and rotational speed as Calcomp's 3330 equivalents, so transfer rate remains the same at 806 kbyte/sec.

IBM's 3350 has considerably greater linear bit density and about the same rotational speed, so its transfer rate is considerably higher, the Calcomp spokesman noted.

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## IBM Pushes 'Flexible' Standards

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK — "Flexibility" is apparently the keyword in the IBM approach toward standards, according to documents released here as part of depositions taken in the U.S. Government's antitrust case against the firm.

In fact, IBM often worked in the standards area with a two-faced approach, taking one position for "external" consumption and the other for "internal" use, the documents showed.

Most of the previously internal documents came to light with the deposition of L.J. Rankine, who served as IBM director of standards.

"I understand that competitive thrusts in the magnetic tape and disk area," Rankine said in one letter, "aimed either at specific gaps in our product line or at

products losing their ability to compete will be countered by technological innovations.

"While Corporate Standards is certainly supportive to this approach, I want to point out that it can lead to exposure in the standards environment," he added, noting that standards work would therefore aim for "flexibility" in standards "wherever possible."

The documents also spelled out how IBM attempted to gain this flexibility in specific areas.

An "IBM Confidential Standards Strategy for Magnetic Tape Cassettes," for example, showed that, while a specific standard for cassettes was being worked on within IBM, the firm sought externally only to develop nonrestrictive guidelines for such units.

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# GAO Finds Grantees Wasting DP Money

(Continued from Page 1)

to back up their decision, the report indicated.

Despite findings previously published by both GAO and OMB on the cheapest methods of acquisition of DP equip-

ment — and despite their recommendations to buy rather than lease or rent — grantees are not complying with such principles, the report said.

Half the leasing grantees admitted they had neither considered purchasing nor

analyzed the potential savings purchasing would allow.

Federal grantor agencies, with the exception of Manpower and LEAA, usually do not get involved in financing decisions, the report said.

The report also noted grantees have made very little effort to use suppliers other than computer mainframe manufacturers for DP gear.

Of 27 grantees with their own computers, only six obtained equipment from a source other than an original mainframe manufacturer, the report said.

While federal grantors should have been aware of savings offered by excluded vendors, such as used equipment vendors and independents, they nevertheless permitted grantees to follow state and local procedures and did not specify alternate sources that could have been considered.

One state agency receiving federal funds from the NHTSA, for example, has acquired DP equipment and upgraded it twice since 1967. In each case, all peripheral equipment was obtained from the mainframe manufacturer.

An independent peripheral equipment manufacturer estimated it could have supplied certain of those peripheral devices at a two-year cost of \$27,000 less than what the grantee was paying, the report said.

Similar findings were made by Labor Department auditors at two grantee locations, the report noted.

Further, one grantee had not explored the opportunity to purchase its system from a third party after the first year's rental.

In these two systems alone, the auditors estimated, \$500,000 could have been saved if proper management practices were applied to hardware acquisition, according to the GAO report.

## Union Balks at DP-Set Routes

(Continued from Page 1)

other East Coast cities too.

However, O'Connor said he is unsure whether there is enough opposition to prevent ratification of the contract.

A Postal Service spokesman said he expected the contract would be ratified.

The Kokomo Plan, now being tested in Kokomo, Ind. and elsewhere, involves collection of data on the "work value" of delivering mail in different city blocks. A computer then processes the data and provides postal supervisors with the information, which enables them to assign routes requiring equal physical effort.

Some routes now require much less work than others, according to postal officials. "All we want is a fair day's work for a fair day's pay," one said.

Union officials, however, charged the plan ignores the physical differences between young and old, healthy and ill

## Calcomp System Cost Less Than IBM 3350

(Continued from Page 1)

Calcomp also introduced the 235-1 and 235-2 drives, which are 100M-byte and 200M-byte equivalents of the IBM 3330 and 3330-11. Both Calcomp drives can later be field upgraded to 400M-byte 235-4 units "at modest cost," Calcomp said.

Changing a removable-pack 235-1 or -2 drive into a fixed-disk 235-4 should be simpler than upgrading from a 3330 to a 3330-11, a spokesman said, since Calcomp does not expect to change spindles during the upgrade.

Calcomp will continue to offer its 230 and 235 for the time being. Unlike the 235-1 and -2, however, these units cannot be upgraded to a 235-4.

The 1035 series controller will accommodate combinations of 235 spindles with up to 3.2 billion bytes of storage.

Purchase prices, exclusive of controller, range from \$11,000 to \$16,750 per spindle. Controller prices range from \$27,500 to \$36,000.

Delivery of the 235-1 and 235-2 systems is 90 days.

Quantity deliveries of the 235-4 fixed-disk drive are scheduled to begin July 1, 1976, from the firm at 2411 W. La Palma Ave., 92801.

letter carriers.

Current practice can match a route with a person's physical capabilities, said James E. Rademacher, president of Nalc. The Kokomo Plan would not take the individual's strides, gait or endurance into account, he said.

Union officials also said the Kokomo Plan alone could eliminate 15,000 jobs nationwide while mail volume grows.

Earlier this year, Rademacher said nationwide implementation of the Kokomo Plan would leave him no alternative other than a national work stoppage.

Postal officials see it differently. "We still recognize the need to assist an individual, such as someone near retirement age or coming back from an illness," but this could be done with someone else working overtime, said James R. Braughton, director of delivery services for the U.S. Postal Service.

"We would like to avoid changing [routes] when the individual assigned to that route changes," he said. The new approach "could be a stabilizer for our delivery system," he added.

Braughton said fear of "robotization" was based on misunderstanding, "a lot of it on what role the computer will play."

The computer is only a tool, he explained. "It merely takes the information, assembles it and makes it available to the supervisor, who still makes all of the decisions using his human judgment."

## Ansi Starts Work on Final PL/I

WASHINGTON, D.C. — The public comment period has ended for the draft standard for PL/I proposed by the American National Standards Institute (Ansi).

Though "a number of comments" were received, most were editorial in nature and the final standard is likely to be published by year-end, according to Robert Brown, secretary of Ansi's X3 Committee.

Responses to the call for comments [CW, April 9] were worldwide and generally sincere, Brown said. Points were presented well and — happily for the committee working on the standard — almost all were in English.

Committee X3J1 will meet toward the end of August to consider newly

received comments and will pass along its draft standard, with any revisions, to a committee of the European Computer Manufacturers' Association (Ecma), which is working in parallel with the American group.

The Ecma group is set to meet in September and the final standard should be "just about cleaned up" at that meeting, Brown said.

In the U.S., the final document will then have to go through approval cycles, including letter ballots at the X3 level (for technicalities) and at Ansi (for legalities that may have been overlooked by the technicians).

This process should be complete before the end of December "barring unforeseen problems," Brown said.

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## Lists All Openings in 40 States

# National Data Bank Indicates Job Opportunity Trends

By Toni Wiseman  
Of the CW Staff

OKLAHOMA CITY, Okla. — In these times of recession and unemployment, it might be reassuring to know there is a computer-based, nationwide listing of all jobs available in 40 states.

And it can be comforting to know jobs for computer programmers compose one of the three top "high-volume" occupation categories included in the job bank, which lists numerous openings for programmers in Washington, D.C., New York City and St. Louis.

Unfortunately, however, the Department of Labor, which finances and operates the system, cannot give out any figures on the number of people who have been placed through the service.

In fact, the department cannot even attest that anyone has been placed directly through the system, which is said to be used primarily as a data check.

The Job Bank Openings Summary (JBOS) is a monthly report of potential

employment listing full-time, permanent job openings cross-indexed by occupation and geographic area.

The monthly report indicates overall trends in job openings, the percentage of openings available that remained unfilled for 30 days or more and the average number of opportunities available per job bank per month.

The system compiles a monthly listing of the job opportunities reported by employment service agencies in 40 states, the District of Columbia and Puerto Rico, according to Laymond Crump, director of information for the project.

### Magnetic Tapes Compile

Once a month, each state sends in a magnetic tape to the Oklahoma City Employment Security Commission, where it is run through a program called Job Bank 90, a preparation process which formats each state's job bank data, strips off the information which is needed and reformats it. The information is then processed to prepare a master fiche tape.

The entire process takes 25 to 30 hours of processing time on the center's IBM 360/40, according to Hugh Jennings, DP manager for the Oklahoma center.

"There were some problems in the beginning with tape compatibility, but lately we haven't had a lot more than you would normally expect from tapes created on another system," Jennings said.

He admitted that the center now has a more modern, sensitive tape drive which has probably contributed a lot of the decrease in reading problems.

From the master tape, sets of some 160 fiche are prepared and sent to each state service and other agencies, Crump said, including overseas military job counselors.

The fiche list job openings by state and by occupational title under each state.

For instance, if a carpenter is looking for a job and doesn't care where it is, he can look under "carpenter" and find out how many openings are available in that occupation, how many unfilled at the end of last month, how many have been unfilled for 30 days or more and what the wages are.

On the other hand, if someone is just interested in working in Washington, D.C., there is a microfiche card each month for that city containing every occupation for which there was demand listed with the Washington Manpower office job bank.

The system was initially developed to help members of the Armed Forces returning from Vietnam who wanted to know what their hometown job markets looked like, according to Alan Moss of

the Manpower Administration Office in Washington, D.C.

"The stress now is to use the thing for unemployed people and people entering the labor market for the first time," he said.

"As far as people actually getting jobs and being placed on jobs, however, we don't measure that because the system isn't designed to do it," Moss said, "although there are going to be attempts made to use it that way in the future."

"We're using it more as a data check than anything else," he added.

Each individual job bank has access to such specialized data, Moss said, but in the monthly report one can only subtract the number of unfilled openings from the openings listed available during the month.

And this, he said, does not take into account jobs which have been canceled or remain unfilled because of undesirable wages, benefits or working conditions; in addition, public employment service openings information may not be fully representative of the total job market situation in some areas.

However, the report does indicate trends. The May 1975 report, for example, showed that, for close to 60 of the occupations for which openings were reported, each accounted for 1,000 or more job opportunities nationwide.

In addition to computer programmers, other "high-volume" occupations identified by the job bank included engineers (with most openings in St. Louis, Houston and Madison, Wis.) and automobile mechanics (Pittsburgh, Tallahassee and Dallas).

## IBM Aim 'Flexible' Standards

(Continued from Page 1)

This was apparently because "IBM may be embarrassed by planned program announcements which may be construed as ignoring the voluntary standards effort" and because "a standard different to IBM's implementation may be adopted."

Therefore the firm was ordered to strive for a wide variety of cassette standards or stop participating in such standards efforts if it was not able to get its way.

One of IBM's problems at the time, according to the documents, was that it was planning products that did not meet any of the proposed standards, but at the same time wanted to "avoid any appearance of delaying meaningful standardization activities."

### Print Quality Standards

In another area, IBM was concerned with the print quality standards being proposed for printers producing documents for OCR readers.

In a confidential document, the firm said its printer could meet the proposed U.S. standard in the area "because of escape clauses" in that document.

However, the firm was worried that "the existing international print quality draft standard may be prematurely enforced and our printer products may not conform."

So, because its printers might not live up to the proposed standard, the firm put considerable muscle behind a move to have that standard issued only as a guide.

IBM also had a problem in the area of communications codes, where the U.S. government was pushing for Ascii as a standard code, not only for information

interchange, but also for a system's internal structure. IBM products relied solely on Ebcidc internally.

The answer was once again flexibility, with the firm "urging the standards committees to consider a catalogue of standards from which a useful total systems architecture can be derived" instead of pressing for the standardization of Ebcidc or planning Ascii products. (This, however, was to last only until the Future Systems decade, when the internal structure was slated to be Ascii, according to the documents.)

But a later Management Committee report noted "we are in a position of weakness due to the fact that some elements of the government will look on any new computer product as being unresponsive as long as the internal code is not Ascii."

To blunt the effects of this, the committee, which was one of the top groups in IBM, asked the DP group "to make top-level calls on key government officials . . . so that our approach for future programs will be obvious."

In the area of Cobol, the documents also showed some concern on the part of IBM planners.

The planners noted that, at the time (1970), proposals for a data base made by Codasyl "are incompatible with IBM's planned data base/data management support."

At the same time, the firm noted that the American National Standards (ANS) standardization committee had virtually handed over responsibility for "compatibility between revisions of the Cobol standard" to Codasyl.

## Texas Plan Reduces City Busing

(Continued from Page 1)

out various grids to be bused.

This solution to the problem of integration in Corpus met with three major objections, Rupp said. People living in those areas scheduled to be bused felt that their property values would go down and that a few children, 1,500 out of a total elementary school population of 22,000, would pay the price of integration for all. In addition, they wondered what would happen next year and the year after that.

### Reassigned Bused Grids

Rather than bus this same group of children for all six elementary school years, the committee of computer scientists and laymen working on the plan modified it to reassign the bused grids back to their neighborhood schools. They then made the selection of areas to be bused the responsibility of each school, Rupp explained.

"The whole of each school's student

population thus becomes responsible for filling the quota of those to be bused in that area," he said. "Children will only be bused one year out of every four or five."

Rupp noted this modification made the plan much stronger and more versatile in the eyes of Corpus residents. "With any busing plan, you don't count how much support you have, but rather whether there is mass opposition. People seem to understand and accept what we've done," he said.

Rupp added he hoped the program could be rerun to incorporate improvements next year. He would also like to see the city establish a permanent contract with a computer center or service bureau so runs won't have to be made in the middle of the night or after a payroll has been completed.

The city has been contacted by officials from Cleveland, Ohio, for information on its plan. Cleveland has been ordered to integrate a school system involving some 170,000 children during the next year.



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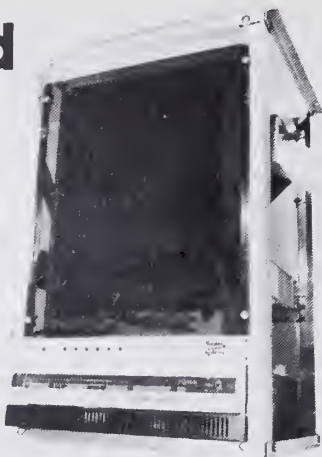
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## All Secondary Schools to Have DP in Ten Years, Study Predicts

By John Hebert  
Of the CW Staff

WASHINGTON, D.C. - Every public secondary school in the U.S. will have a computer or computer capability by 1984, according to a study sponsored by the National Science Foundation (NSF).

Some type of administrative, instructional or combined usage will be found in 100% of the schools containing grade levels seven through 12 by then. And 51.1% of these schools will use computers in at least an instructional capacity, according to the soon-to-be-published study.

These statistical projections are "conservative estimates" taken from results of a national survey on computing activities in secondary education called Project Case, conducted by the American Institutes for Research, according to Dr. Arthur Korotkin, principal investigator on the project.

Project Case, completed in October 1974, surveyed 25% of all public secondary schools in the U.S. on a random-sample basis. All states were represented by the 5,580-school sample, and the results are based on 3,643 responses, Korotkin said.

### Total Use

Research results placed the total use of computers or computer capability in U.S. secondary schools at 58.2% in 1974, compared with 34.4% in 1970, Korotkin said.

While purely instructional usage has grown only from 3.9% in 1970 to 4.9% in 1974, administrative uses have increased from 21.5% to 31.5%.

Combined usage in these two categories has jumped from 9% to 21.8% over the four-year span, Korotkin said.

The slow progress of computing activities dedicated to instruction or classroom use, he said, may be because "there is a lack of communication between people involved in computing at different schools."

The slow progress might be attributed, in part, to people in the schools having to "reinvent the wheel" each time a problem has to be solved or innovative ideas implemented. There is probably little or no realization that the same problem has occurred at other schools, he explained.

Looking at the data, "the trend is toward combined use, especially in schools that have been using computers for some time," he explained.

A conservative, straight-line projection places this combined type of application in 100% of all secondary schools within 10 years of the study's 1974 completion date but an accelerated growth rate is expected and is "just more likely," he added.

The data also demonstrated secondary schools have not been spending more money for computing activities in the last four years.

"The schools seem to be doing more with what they have. They're more efficient," he said, indicating a trend for computing growth without added expenditure.

Korotkin also said less money is being spent, in part, because the cost of computing has decreased since the 1970 study was completed.

Results of the study also exhibit movement toward the minicomputer. The reason for this, Korotkin said, is in-house capabilities are more advantageous than, for example, subscribing to a time-sharing service, in spite of the smaller memory capacity of the mini.

And "more schools are buying rather than leasing," he explained, putting minis more within the range of school system budgets.

The American Institutes for Research is at 3301 New Mexico Ave. N.W., 20016.

## Medicare Claimants Underpaid

(Continued from Page 1)

claims sampled by GAO revealed only an 8% error rate.

A meeting will be held this week to review the disputed findings.

Claims filed with insurance carriers in the area studied are coded by claims-processing personnel to indicate the type of medical procedure the physician performed. Some errors occur here, a BHI spokesman said.

That information then goes to data-entry personnel who use CRT terminals to enter the information into the system for processing. While the most obvious errors are brought to the CRT operators' attention through a built-in edit program, many errors go undetected at this stage of claims processing because of simple key-stroke errors, he explained.

The system permits underpayments as well as overpayments, a spokesman on Holtzman's staff pointed out.

The report also criticized the practice of lump coding - coding two or more separate procedures performed on the same day into one, thus reducing the amount of reimbursement allowed.

Patients participating in the Medicare program are reimbursed 80% of the "reasonable charge" for treatment, in accordance with rates established by BHI. The balance is paid by the patient.

If a patient receives two or more treatments on the same day, which in many cases are billed separately, and the coding clerk lump-codes the claim under one procedure, the patient will be reimbursed for 80% of the reasonable charge for one procedure instead of both. He then will be faced with paying 100% of the charge for the second procedure in addition to

the 20% balance for the first.

A secondary effect of lump coding is inaccurately skewed fees, the report said. Since the fee schedule is based in part on fees charged by physicians, unusually large actual fees attributed to a single procedure because of lump coding will produce a higher reasonable charge. This costs taxpayers money, GAO report said.

The report recommended that unusually large and unusually small actual charges be eliminated when determining fee schedules. The report found that underpayment of elderly patients has produced severe hardships.

Findings were based on claims filed during a single three-month period in 1974. Figures have been extrapolated over all four quarters, the BHI spokesman pointed out.

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## By U.S. District Court

## National Bank Terminal off Premises Ruled Branch

By Nancy French  
Of the CW Staff

WASHINGTON, D.C. — Customer bank communication terminals (CBCT) operated in locations remote from the bank itself, constitute a branch bank, and as such, are subject to laws governing branch banking, a U.S. district court judge ruled here recently.

void" a decision announced by the U.S. currency comptroller, James Smith, last December permitting national banks to begin serving customers with the CBCTs offbank premises.

Smith filed a motion in the district court for a stay on the ruling until an appeal can be heard, but this was denied. A similar motion will be filed shortly with the court of appeals.

U.S. District Court Judge Aubrey Robinson's ruling has been interpreted by some as not only prohibiting national banks from installing any more CBCTs, but also requiring them to discontinue operating in existing locations. A spokesman in the currency comptroller's office said "that is up to interpretation."

The ruling, which affects only national banks, came in a suit brought by the Independent Bankers Association of America. The association represents many smaller banks that feared the larger national banks would install terminals in their locales and siphon off their business, a spokesman explained.

State-chartered commercial banks still are permitted by statutes in 13 states to operate CBCTs, placing national banks in those states at a competitive disadvantage, the spokesman said.

The ruling does not affect CBCTs operated by savings and loan institutions such as the activity now going on in the Hinky Dinky supermarket chains, since these banks operate under a different body of law and come under the authority of the Federal Home Loan Bank Board.

The national banks had begun to install terminals linked to large central processors at the banks to permit bank customers to withdraw cash from their accounts, transfer funds from savings to checking accounts and make purchases by credit.

In giving the national banks the go ahead last December, Smith expressed the view that, since the CBCTs did not provide all the bank's services such as mortgage payment and loan payment and "lacked the physical characteristics" of a branch bank,

they did not constitute branch banks.

Robinson called Smith's argument "without merit," contending that an electronic terminal "transacts business which is carried on at a main office" and is, therefore, a branch under federal

banking law.

Robinson did not have a national bank operating a CBCT as a defendant, and he made the ruling "in the abstract" without any specific facts before the court, the currency comptroller's spokesman said.

Policeman, Detective Agency Head  
Cleared of Selling Criminal RecordsBy Nancy French  
Of the CW Staff

BOSTON — A state police officer and the president of a detective agency here have been found not guilty of selling criminal records to two supermarket chains and a large department store.

District Court Judge Theodore Glynn ruled in Suffolk Superior Court that insufficient evidence had been presented to link Sgt. Gerald Crowley and Stanley Colten, president of Romar Service Systems, Inc., with the sale of the criminal records to Filene's, Fernandes and Stop and Shop.

Many employers try to purchase rap sheets to determine whether a potential employee has a criminal record. In states where laws have been passed to protect the privacy of such records, there is no legal way for an employer to get them.

Prosecution of this case was the culmination of the first investigation made under Massachusetts' privacy law [CW, March 20].

The law requires an audit trail

be maintained on all requests for criminal history information from the computerized files. That record alerted investigators that several state police officers had been requesting far more criminal histories than they would have normally needed to perform their duties. Only one, however, was brought to trial.

## Evidence Ruled Inadmissible

The most significant piece of evidence in the case — a notebook containing the names of individuals whose records had been furnished to the stores — was ruled inadmissible by the judge on a technicality.

The document, which was found in Crowley's desk after he was dismissed from his Department of Public Safety job, was ruled to be "a statement" of the defendant rather than a piece of physical evidence.

## Protests Introduction

The defense attorney protested against the notebook's introduction as evidence because it had not been furnished by the prosecution in response to his motion of discovery requesting all statements of the defendant.

Under the law, all statements and physical evidence used

against an individual in a trial must be made known to the defendant or his attorney.

The balance of evidence presented by the prosecution, including testimony from the Romar agency bookkeeper who issued checks to Crowley, store employees who obtained the information from Romar, and teletypewriter audit trails from the file repository, were insufficient to show direct involvement between Colten and the stores and, hence, Crowley and the stores.

## No Indictment of Romar

Early in the case, state prosecutors decided against indicting Romar, which would have been a somewhat easier case to prove, critics said.

Privacy advocates who followed the case said they were disappointed with the manner in which the attorney general's office handled the case. Several different attorneys who had no particular expertise in the privacy issue were assigned along the way, and apparently little importance was placed on the outcome.

"It's too bad, it could have set an important precedent," one critic said.

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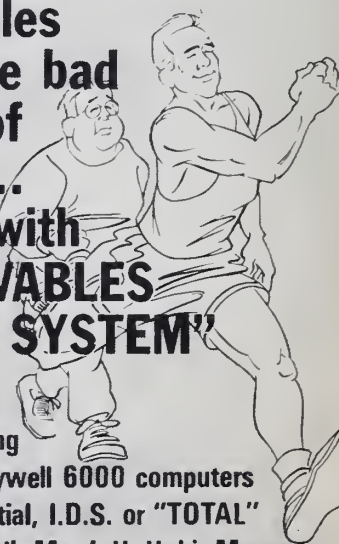
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# To Move Up, DPers Must Cultivate Management 'Image'

By Ronald A. Frank

Of the CW Staff

LACONIA, N.H. — For DP managers to move into top management in their organizations, they "must look like, think like, smell like and feel like a general

manager," according to Herbert Halbrecht, president of Halbrecht Associates, Inc.

Speaking at a session of the recent National Association for State Information Systems (Nasis) conference, Halbrecht

said the most important issue is how top management perceives the capabilities of the DP manager. But even if the DP chief has a good image, advancement into more general management positions is limited and difficult,

he told the attendees.

While the DP manager should be competitive in nature, he cannot afford to have others within his organization look at him in that character. "If you, as the head of DP, look better than your clients (using departments), you can win meetings, but you can lose the war. Because they can and they will and they should kill you when you do that in a meeting situation," Halbrecht said.

## Users Higher

If you try to put down your users in meeting situations, you are going to get killed, because usually the using department managers are at higher levels than the DP manager.

The DP function and its manager within a corporation are a difficult department to measure in terms of effectiveness. The closest yardstick so far devised is user satisfaction, Halbrecht said. Things such as administration of a DP budget are measures of

efficiency, but they do not tell the complete story.

The DP operation should be part of a central management steering committee that looks at corporate goals. When this happens, the DP manager begins to function as part of the corporate team. And his status as a potential top manager takes on a new dimension, Halbrecht suggested.

## Unrecognized Threats

"Too many DP managers fail to recognize how they threaten the career and professional investment of others," he said. To dispell this image of DP managers and their operations, the computer center must become an essential department necessary to implement corporate goals.

As long as DP managers and their staffs are regarded as service organizations to other users within the corporation, the chances for an advancement into top management will be very slim, he said.

## Vendor Personnel Access to DP Center Often Greatest Threat to Security

LACONIA, N.H. — Access of vendor customer engineers often are the worst security risks to a DP center.

It is very difficult for a user to have a secure center when vendor personnel can come and go as they please — especially if they cannot pass routine security checks.

These user concerns were brought out at a seminar session on security practices at the recent National Association for State Information Systems (Nasis) conference.

In some states, when the security of criminal justice DP systems is affected, state police or other safety officials are given a hand in assuring the security of the system. But even in less critical applications, the security of vendor personnel remains a problem.

Even when the DP site is made secure, access to remote terminals remains under the control of the using department. This easier terminal access puts the integrity of the system at the mercy of a password, and physical security measures cannot be used.

Password usage and/or operator identification methods are much more difficult when terminals operate at remote sites, it was agreed. One safeguard is to keep similar security-level terminals on the same multi-dropped lines, one user suggested.

A high-security line should not include medium-security terminals, since this can invite compromise of the system from unauthorized users.

## Breaches Due to Incompetence

Security breaches due to incompetence are much more prevalent than intentional security abuses, according to Robert Courtney of IBM, who participated in the seminar. In most cases, people misuse system resources they have been given to use, he said.

In one instance, a West Coast firm lost \$32 million recently because of an inventory control problem. About \$18 million in stock was dumped because it was declared obsolete, and it cost the company \$32 million to

buy back the same inventory, Courtney said.

In another case of more deliberate system compromise, a company's personnel files were used to send union-organizing material to white collar workers.

The system involved used dual IBM 370/168s operating with Time-Sharing Option (TSO) under OS/MVT.

The DP staff was spending its efforts on determining "how to button up TSO," Courtney said, when they should have been

studying how the personnel files were compromised.

It turned out the unauthorized access to personnel files could be traced to a stolen tape, and 11 persons had access to the tape, he said.

By examining the address labels used to mail out the union letters, it was determined that a certain printer had been used for the unauthorized mailing. Two employees had access to the printer and one admitted that he had taken the tape.

## Solution to Dedicated Vs. Shared Controversy Urged

By Ronald A. Frank

Of the CW Staff

LACONIA, N.H. — "When you want control over your information, and you want control over your communications system, and you don't trust scientists, and you don't understand the technology, you go dedicated," Dr. Ruth Davis said at the annual National Association for State Information Systems (Nasis) conference here last week.

With these words, Davis, who is director of the Institute for Computer Sciences and Technology at the National Bureau of Standards, jumped into the middle of an escalating controversy over dedicated systems now being required for law enforcement files by the Justice Department. She added that there is another choice.

"If you can understand a little about computer science, and you think you can control the information control system and the people, and you think you can guarantee the integrity of the information," then you might go the shared-computer route, she said.

Three times the controversy over dedicated vs. shared computers has been aired in the press, and each of the resolutions of the past has been, at best, a "part-time solution," Davis said.

Hardware developments with microcomputers and minicomputers are helping both sides of the debate.

"This is helping both dedicated system pushers as well as shared

system hookers," she said. Since there is not a good technological solution to this problem, Davis said, the industry will probably do the same thing it has done twice before. "We will end up with some kind of detente that will defer the problem until there is something worse to talk about," she predicted.

"When we look at what is happening in the very near future, we see people talking about a new kind of distributed architecture which is both geographically and functionally distributed. The architecture has functionally specialized proces-

sor modules that are interconnected so that, through virtual concepts, parallel processing and software, the user can generally execute programs in absolute safety. And the interprocessor communications will be interconnected so that safety and reliability are possible through very complex protocols," Davis stated.

"To my mind, that means we are going to have dedicated computer systems" with all their faults "interconnected with data communications with all its faults," she said.

"We're going to have an over-

arching operating kind of system that is going to try to control parallel processing and is going to have much greater overhead than anything we have had up to the present time.

"We are going to have interfaces that are so complex as to probably preclude competition unless we are willing to compete with software of a microprocessor type and with firmware," she added.

"All this adds up to the worst problems of dedicated and shared systems with an inability to have competition with software and hardware," she said.

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# University Students Simulate Psychological Research

ANN ARBOR, Mich. — Students at the University of Michigan are receiving first-hand experience in the intricacies of experimental research design and methodology through the use of computer simulations.

While sophomore psychology students run complex experiments on rats, others study early learning and memory in chicks, both of which would require extensive laboratory facilities and prior knowledge and experience.

Graduate students in the School of Education are making up or choosing between programs affecting as many as 24,000 hypothetical public school students.

Their "lessons," which would normally be too costly, risky and time-consuming for college students to study in actual situa-

tions, are possible because of the simulations, which are used in the university's Department of Psychology and in the Graduate School of Education.

Basically, the computer is used to generate data that would otherwise have to be gathered through tests, interviews or observations by the university's students working in the field.

By letting the computer supply the raw data, the most costly and time-consuming phase of research is overcome.

Data is generated by a model programmed on an IBM 370 in Fortran IV. The computer accepts programs in both batch and interactive forms.

There are six programs, which require no special knowledge or training in computer science, in the psychology library and more

are being developed.

To use the programs in the introductory lab course in experimental simulation (Exper-Sim), designed and supervised by Dr. Dana B. Main, students enter the name of the model they want to study, specifying the experimental conditions and the number of subjects in each condition.

In addition to returning results of the tests, the computer is programmed to tell users how much their particular experiment would have cost in a real-life situation, allowing them the opportunity to work within a realistic budget.

In the lab, students design, carry out and evaluate research projects on schizophrenia, drug use, motivation and social facilitation, in addition to other

topics.

At the outset of the most basic problems, students receive a brief description of the situation and theories about the situation causes, cures or effects. The student is then given all relevant and manipulable variables. The data-generating model may also describe imposed limits on these variables.

## Designs Experiment

With this information, the student designs an experiment, specifying the number, sizes and specifications of experimental groups.

From data generated by the computer, the student follows the original goal, whether it is to formulate a hypothesis, design a larger experiment or answer specific questions.

In more complex programs, variable ranges and conditions are not defined by the instructor, but left up to the student.

If realistic limits are surpassed, this will be reflected in the data.

The simulation program used in the School of Education, which emphasizes a formative evaluation and heuristic approach (Fehr-Practicum) occurs in mythical Fair City, U.S.A.

Students in the course program, designed and maintained by Dr. Leverne S. Collet, learn program research and evaluation methods involved in a public

school system.

The data generator in this case provides detailed information on any or all of Fair City's 24,000 public school students. Each problem in the Fehr-Practicum simulation has two phases.

During the first phase, the descriptive phase, each research team is concerned with acquiring a definition of the particular problem. To obtain their definition, students review literature supplied by the information bank and conduct computer tests using any number of a variety of available variables.

In the comparative phase, the teams design and conduct an experiment to measure the effectiveness of each available solution provided with the problem. Then, one of the remedies is submitted to the game manager who implements the chosen solution in the school system.

The computer allows the game manager to put each Fair City student through the chosen solution, return the student to zero and try another treatment.

At the end of each two-phase problem, there is a consolidation session. During this session, the teams get together and review each others' decisions.

As in Exper-Sim, students in the Fehr-Practicum work within a budget, similar to the budgets they might be restricted to in a real-life situation.

## Sent to Senate

# House Repeals Parent Locator Service

By Nancy French  
Of the CW Staff

WASHINGTON, D.C. — The House of Representatives has voted 357 to 37 to abolish the Parent Locator Service, a controversial provision in the 1974 amendments to the Social Security Act dealing with child support [CW, April 23].

The measure was sent to the Senate, where it has been taken up by the Finance Committee. Sources say, however, they do not expect the Senate to follow the House action.

Meanwhile, the law went into effect Aug. 1.

The parent locator unit established within the Department of Health, Education and Welfare's

(HEW) Social and Rehabilitation Service has been charged with using virtually any means necessary to locate absent parents whose children are supported with federal Aid to Dependent Children funds.

This includes access to the files of any federal agency and might take the form of running magnetic tape records of missing parents' names and Social Security numbers against master tapes in the Internal Revenue Service (IRS) as well as the Social Security Administration (SSA).

Officials say such records could provide the last known address or employer of a missing parent.

Under the law, states that refuse to cooperate by supplying

the name and Social Security number of the missing parent would have their funds cut by 5%.

Another provision of the Child Support Law repealed by the House was the authorization to use federal court orders to enforce court orders for delinquent child support.

# SCDP Offers CDP Exam Review Course

HUDSON, Mass. — DPers interested in taking the February 1976 exam for the Certificate in Data Processing (CDP) can enroll in the CDP Candidate Assistance Program offered by the Society of Certified Data Processors

(SCDP).

The SCDP conducts the review and preparation program through the mail, like a correspondence course, for \$50.

CDP candidates receive a series of diagnostic examinations that cover each section of the actual exam. From these diagnostic tests, the SCDP determines the areas of weakness on which the candidate should concentrate.

The SCDP also tutors candidates based on their responses to the diagnostic tests and provides them with reading assignments matched to their needs.

At the end of the tutorial program, a CDP holder administers a comprehensive "monitor exam" consisting of more than

500 questions of the type found on the CDP exam. After reviewing the results of the monitor exam, the SCDP provides a synopsis of subject areas in which the candidate requires final study.

The complete review program can be completed in two or three months, the SCDP said. Alternately, the SCDP will sell the set of diagnostic tests and answer sheet for \$15. Individual tests cost \$3 each.

The SCDP will also provide review programs for individual sections of the CDP exam at a lower price. The CDP monitor exam costs \$35.

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## On Vessels in Three Ports

# Net Permits Users to Access Ship Data in Moments

By John Hebert  
Of the CW Staff

NEW YORK — A commercial shipping company here has pioneered development of a computer system to keep detailed information on commercial vessels which traffic the harbors of New York, Baltimore and Philadelphia.

The three ports presently exchange ship data — vessels' names, tonnage, flag, sailing date and time, material aboard, previous port of call and destination, if known — through the mail, according to Frederick F. Livingston, maritime intelligence director of the Maritime Association of the Port of New York and coordinator of the triport effort.

Presently, computer terminals are installed only at the maritime association in New York, Livingston said.

If there is enough enthusiasm generated by clients of this and other maritime associations, terminals will be installed

elsewhere to hasten the job of providing information, Livingston said.

By using the computer system linked to display terminals, any subscriber association and its customers could obtain detailed data on ships' vital statistics in a matter of moments, he added.

### Reason for Network

The reason for this emphasis on shipping intelligence networking is that "people like to know what their competitors are doing" or, as is the case in New York, the Coast Guard and similar organizations like to know what ships are in and out of the port, Livingston explained.

There are approximately 700 vessels which traffic the waters of New York harbor each month, he added.

Computerization of shipping traffic intelligence facilitates the compilation of information previously handled manually, when the data was not used to its full

potential and advantage, he said.

More important, it will allow for compilation of an itinerary of all commercial vessels on the Atlantic coast and possibly other areas as well and keep member costs down, according to Joseph Rafferty, manager of the Baltimore Maritime Exchange.

Nobody really cares whether a ship has arrived, but each ship owner or agent would like to know of his competitor's next move — and nobody wants to be the first to render that information to the maritime associations, Rafferty explained.

It's getting the inventory of future movements that is the problem, rather than getting computer terminals, Rafferty said. There's just no need for them until information on vessel destinations is received, he added.

The main hurdle that must be overcome to implement a system of this type is to establish an itinerary of worth to members and customers of the maritime associations, Rafferty said.

"The associations are close-knit, quiet groups. What we have to do is break down the agent barrier. More modern communications have to be available," he said. The computer system of itinerary logging would allow and facilitate communications availability.

The effort, temporarily dubbed the Triport Computerized Shipping Intelligence Network, is being attempted because "we think our members and customers will call upon us for that [itinerary] information in the near future and, when they do, we want to be able to get back to them in a very short time with detailed information," Rafferty explained.

The Maritime Association of the Port of New York has already set the foundation for the network on a General Electric Mark III system at a GE division in Cleveland, Livingston said.

The only problems at the computer end of the network thus far have been with normal start-up and debugging operations, he said.

The New York association also presently has a smaller, parallel system of the larger, proposed system, employing 14 teletypewriter terminals in association of offices around the harbor which compile information for area customers.

Lloyds of London has been a customer of the New York association for some time now, communicating business via Telex International, and Livingston hopes he can get Lloyds and other companies as subscribers to the new system, using either satellite or cable communications if necessary, he added.

## Attacker Goes Unprosecuted Due to Failure to Enter Data

NEW ORLEANS — A man died here as a result of a gunshot wound, but the most serious charge that can be brought against his attacker is aggravated battery, and even that appears unlikely now, police said.

A conviction is unlikely, first, because the suspect's name was not entered into the district's computerized law enforcement information system at the time of the attack. Secondly, there were no witnesses, and the subject, who just died, is the only person who could have testified against his attacker.

No one seems to know why the data was never keyed into the computer data bank even though the suspect was arrested several times after the shooting, a

police spokesman said. "The Teletype message just got lost," he said.

Ronnie Holmes, 20, died as he was being readmitted to Charity Hospital, here, 2-1/2 years after being shot in the head.

He had been treated for the gunshot wound and was living a normal life up to the day he died suddenly, a spokesman said.

Holmes was admitted to the hospital with symptoms of a stroke, the police spokesman said, but an autopsy showed the death was a direct result of the gunshot wound.

Under Louisiana law, however, to be classified as a homicide, death must occur within a year and a day.

## DP Helps Spot Harmful Trees

HAYWARD, Calif. — A computerized program designed to root out troublesome trees is saving this city tax dollars.

The city embarked on the street tree survey, using a Burroughs Corp. 1700, to discover problem-causing trees before they can do any damage.

Trees, especially large ones, can cause damage to sidewalks, curbs, gutters and sewer lines as their large roots disturb the surrounding environment. Parks superintendent, Bill Owens, feels the long-range

program to remove and replace these trees benefits the resident as well as saves periodic repair work.

The survey indicates whether it is advisable to replace the trees with smaller ones whose roots would do less damage to public facilities, according to Owen.

The costs of removal and replacement is weighed against the continual costs of repair. Owen hopes the data will show a pattern of where and when it pays off to replace trees.

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# 20-20

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## Editorials

### Empty Words

Even while President Gerald R. Ford and Leonid Brezhnev, Soviet Communist Party chief, were in Helsinki signing a declaration about the rights of all people, stories from the Soviet Union indicated increasing pressure on computer scientists wishing to exercise those rights there.

The Helsinki declaration, for example, affirmed the right of people to emigrate between countries. That right is being denied to Soviet Systems Analyst Valentin Turchin [CW, Aug. 13].

Freedom to associate in international meetings is also implicit in the Helsinki declaration, but Dr. Alexander Lerner of the Soviet Union has been barred from participating in the International Joint Conference on Artificial Intelligence (IJCAI) to be held in the USSR this year.

In addition, the Soviets helping to plan the IJCAI have put heavy pressure on the U.S. organizers to bar Jewish participation in the meeting.

These actions are disturbing on two levels: first, on the national policy level and, secondly, on the level of the computer community.

The Association for Computing Machinery (ACM), as one of the participants in the IJCAI, has apparently buckled under to the Soviet demands, violating its own tenets which bar participation in meetings that do not honor the International Council of Scientific Unions standards of scientific interchange.

The bar on the participation of certain Soviet scientists and of U.S. scientists for religious reasons from the IJCAI is an insult to those policies.

The ACM will shame itself, its members and, by reflection, the entire U.S. computer community if it continues to participate in the IJCAI under the strictures laid down by the Soviets.

But perhaps the greater shame is on the national level. The words so solemnly uttered in Helsinki apparently have no meaning if the Ford/Kissinger policy of detente calls for looking the other way whenever there is a violation.

The idea of human freedom and human rights are supposed to be the guiding principles for this nation.

Apparently, they can be easily forgotten in the name of increased trade and detente.

### You Can Help

Surprisingly, members of the U.S. computer community can do something to help Valentin Turchin, the systems analyst who has been barred from emigrating from the USSR for his political stands [CW, Aug. 13].

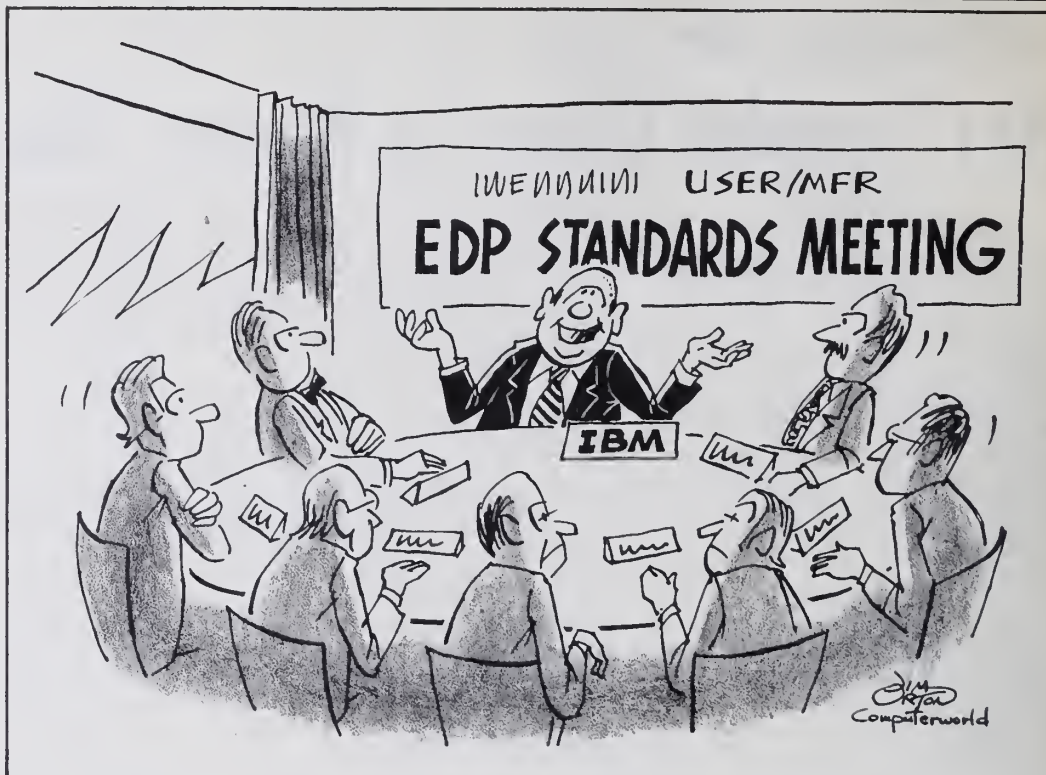
The higher echelons of the Soviet scientific community are sensitive to Western criticism and to letters from the outside world, several Soviet watchers informed us.

A letter from members of the U.S. computer community to these higher-ups could have a profound effect in getting them to pressure the government to allow Turchin to emigrate to an area of his choice, they said.

The letter does not have to be long and diatribes are of little help, the experts said. The letter should just express concern for the fate of Turchin and ask the addressee of the letter to help in Turchin's emigration plans.

In this case, the right man is:

Academician A. Logunov  
Vice-President  
Academy of Science of the USSR  
Moscow, USSR



'Gentlemen, Why Decide This Industry Standard Now? You'll Have It in Three Years Anyway, When Our First Unit Is Delivered . . .'

## Letters to the Editor

### Creating Sensation Appears To Be Sole Purpose of Article

In the July issue of the *Communications of the Association for Computing Machinery*, two men wrote an article entitled "Discrimination in the Employment of Women in the Computer Industry." Based on reliable and documented data (200,000 people), the article concluded, among other things, that "the available data suggest that women are not receiving equal pay for equal work and may not be sharing equally in the opportunities for advancement."

In the July 23 issue of *Computerworld*, two women wrote an article entitled "Majority of Women DPs Find No Job Discrimination." The first paragraph concludes that "a majority of women DPs have never met any sexual discrimination."

The "majority" were 18 women out of a sample of 30, nine of whom had worked less than four years.)

This is irresponsible use of statistics, to say the least!

However, if one can stop seeing red long enough to read the rest of the article, one becomes aware of a different kind of statement, e.g.: "the women were nearly unanimous in crediting the feminist movement with the improvement of their situation in recent years."

The article also included a choice bit about a woman who is the president of a company owned by her husband. This paragon of achievement is totally against the women's movement and pointed out she can get anything done: "I just smile real nice and they'll do anything for me, since I'm just a little bit of a thing."

Dpers, note that the two bit values include zero. The headline and first paragraph did not reflect the sentiment in the rest of the article. We take issue with the editors who designed a two-column headline, on a topic affecting the lives of slightly less than one-third of the population from which the readers are drawn, that seems to have been placed on Page 1 for the sole purpose of creating a sensation, rather than of bringing information to the readership.

Phyllis Fox  
Mary Jane Cross

Short Hills, N.J.

### Male Chauvinist Has Solution

Being a continental European and having read the article, "Majority of Women Find No Job Discrimination" [CW, July 23], I can but smile. There is a much simpler solution to the problem of the underpaid female in DP: less brain, less pay.

Nature did not distribute intelligence and brain according to democratic principles, but along the string of genes. It is a pity everybody accepts this for the physical strength of sexes, but few for the intellectual. You will, of course, call me a male chauvinist. So what? Mind you: Mulier Taceat.

Thomas Mooshammer

Berlin, Germany

### Men Disgrace Themselves, Too

In response to Sandra Keller's letter [CW, Aug. 6], her reference to "women" showed her bias.

The same can be said for men, that those who are strictly concerned with the aesthetics of a "position" are a disgrace.

Comments such as hers make it sound like women have the patent on being concerned only with the aesthetics of a "position" and that men are the only ones willing to buckle down and tackle a serious DP career.

My experience has been that "smiling nice" (and all that is implied) to get ahead only serves to perpetuate already rampant sexist attitudes.

The only way to get ahead is to work constantly, but I do not deceive myself into thinking even this is a sure solution.

Discrimination in business is a long way from being eliminated, and DP is definitely no exception.

Name Withheld by Request

Miami, Fla.

### Sample Drawn From Biased Group

Until I read the article on discrimination against women, I had always thought CW was a fairly respectable publication.

Not only was the sample so small as to be insignificant, it was drawn from another biased, nonrepresentative sample: Computer Caravan attendees. Naturally, CW found little discrimination in this group, for by their presence at the caravan they demonstrated they are not being discriminated against.

The quote from the non-DP-educated woman president of a company owned by her husband was a classic. Of course people treat her nicely in spite of her ignorance — she is the boss!

The opinion that military assignments are made on the basis of rank is only partly true. I spent seven years in the Air Force and six in DP and found assignments to be partly based on rank; other factors were experience, marital status and, especially for women, personal appearance. Recently the Army was forced to stop using full-length photos as part of the assignment process involving women.

J.R. Shannahan

Santa Clara, Calif.



# An Atlanta Proposition

The Data Processing Management Association (DPMA) held its big annual meeting in Atlanta this year. As reported in our news columns at the time, it was a vigorous gathering of the clans. Attendance was good. The exhibits, which have languished for several years, drew a rewarding crowd every day. There was surprisingly little talk about the recession, although DPMA is completely user-oriented and user industries and activities have been much harder hit than the hardware and software suppliers. True, the auto industry boys and girls pretty much stayed home, but the bank contingent, the retailers, the DP service people and the academic camp followers were out in full force.

I did the keynote speech at the opener. Had about 700 listeners, the largest audience of this year for me, and one of the most rewarding. I spoke of a time of change, for DPMA itself and for the North American user community as a whole. And I was reasonably blunt: the association has had serious organizational and financial problems recently, as have many of the outfits which sell to its members. In that context, change is being forced on DPMA people — and beyond that, the incessant upwelling of new technology offers new opportunities but imposes horrid problems.

One change, probably the best change except for the vital turn toward financial stability which the DPMA has managed in the last year, is its entry into Afips, the American Federation of Information Processing Societies. George Glaser, the retiring — no, wrong word — the outgoing Afips chief, gave a major address,

pointing mostly with pride and viewing only slightly with alarm. Like me, he felt that the DPMA and the Federation would strengthen each other.

In referring to that particular change earlier, and speaking from the perspectives of an officer of a founder Afips society, I called for heavier technical commitment in DPMA activities. People in the original Afips societies, I said, had some great solutions; imbedded in computer science and electrical engineering departments, and in computer industry development activities, they were searching for problems. People in DPMA had real down-to-earth problems, but were not being exposed to new methodology. Not through the association, anyhow; the Friendly Local Salesman is still the major source of innovation for most DPMA members.

I had to keep in mind the two major difficulties: current financial limitations and the everlasting problem of startup — no support without a product, and no solid product without customer support. So I suggested two things: cooperation in expanding and improving publications and participation in existing lecture-ship programs.

The Association for Computing Machinery (ACM) is searching for a better way to reach all its members. A professionally edited journal, with paid articles of general interest *a la Scientific American* and carrying substantial news and official material for both associations, is a possibility. An expanded review journal, perhaps under Afips sponsorship and carrying much more business data processing material and the ACM *Computing Reviews*, is another.

The first especially would draw much more advertising support than DPMA's *Data Management* or ACM's *Communications* and could fairly quickly support the additional costs of well-paid editors and contributors.

And both ACM and the hardware Computer Society put on major lectureship programs; I speak at least 20 times a year around the country on the former. For the expense of part-time coordination, and by sharing the somewhat increased travel costs, DPMA chapters could have some innovative conversations with the pundits already on tour.

Other changes are obviously possible. The point is, we are all immersed as individuals and as members of our professional associations in a stream of technical change. Right now, with 1976 almost upon us, with the recession narrowing, with its own internal management improving, is a time for DPMA also to change.



Herb Grosh

# Why Does BankAmericard Still Regard Us as Numbers?

One of the standard objections to computerization is that it results in regarding people simply as numbers. There is something distinctive about a person's name which is absent in a number.

Even mistakes which result from the accidental confusion of Aloysius McConnerty and Aloysius McCannerty can be understood (and therefore forgiven) much more easily than those which stem from confusing 344135 and 344132.

In the Stone Age of automation, there was a real reason why numbers had to be used to distinguish between the McConnertys and McCannertys — we had nothing else to use but numbers for comparison purposes!

Those days are long past, yet the inadequate systems that result from the failure to use more recent technology continue to surround us. They surround us even in areas like the credit card business, which is directly related to human beings with feelings.

Moreover, the force that is ensuring the continuation of the old methods is, at least in the case of BankAmericard, a contractual requirement placed upon the systems by lawyers — and not a technical requirement at all. I am referring particularly to BankAmericard's use of check digits which are based on number identification only and totally ignore the humanly important part of a person's identification.

The letter reduplicated here illustrates the type of error that can and does occur because of the continued use of punched-card technology in computer-level days. The letter was produced by an automated letter-generating system (Legs) at the First and Merchants Bank in Richmond, Va.

The clerk working at a terminal entered the reference number 4368 190 344 135, the type of letter to be sent out and the salutation "Dear Mr. Lee" and left the computer to do the rest.

The Legs system, which is currently being replaced, used the 12 positions of the given identification (the 13th is the check digit) to locate the record 4368 190 344 13 and used it to fill in the address, new retail purchases (\$6.66) cash advances (\$0.00), present balance (\$307.96) and authorized credit limit (\$700.00).

The system then produced the letter, which was mailed to 4368 190 344 13.

Unfortunately, the reference number belonged to the record of Donald Forinash rather than Mr. Lee.

The program itself is faulty, of course. It should determine whether a correct check digit was used. This won't be done until Legs is replaced next month. But, even then, it will be replaced by another program which still uses check digits — just as though we were still using punched cards and tabulators.

The fact is that a modern checking system would provide for separate checking mechanisms for data transmission errors and record recovery accuracy. While a single modulo-10 check can examine some of the transmission and transformation entries in the BankAmericard-stipulated, error-prone number, it does nothing to tie the number into the real part of the identification — the person's name.

Effectively then, BankAmericard is encouraging its clients to rely on a 90% number transmission precaution to perform the task of safeguarding accurate record retrieval. This could be much better taken care of through up-to-date operations designed for the task that is to be performed — record retrieval, not number transmission.

No letter generated by a system should be mailed from any self-respecting firm without its accuracy being checked.

Statements like "Your present balance of \$307.96 now exceeds your authorized credit limit of \$700.00" are not merely nonsense, but indicate the organization simply doesn't spend enough executive time and effort in controlling the DP

Naturally, each check method would have to be developed for each approved letter style, but the work involved here is minor.

In the case in point, any one of three

separate checks would have stopped this and other erroneous letters, which apparently are sent out regularly, and would also speed the sending of the correct information and warning to the person who is supposed to get it.

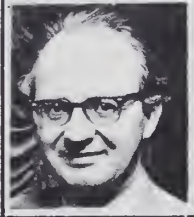
But while the First and Merchants people can be properly blamed, the major industrywide problem lies at BankAmericard's door. By unilaterally laying down the law about check digits to its many clients instead of trying to stay up

with the technology for DP accuracy, BankAmericard has assumed the responsibility for backing a 10% error-approval system. That way it cannot expect others to look for a higher level of accuracy in their own operations.

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## The Taylor Report

By  
Alan Taylor, CDP



May 14, 1975

Donald G. Forinash  
1855 Cleveland Ct.  
Concord, Ca.

Dear Mr. Lee:

We have received additional retail purchases for \$6.66, and cash advances totaling \$0.00, since your last BankAmericard statement was prepared. Your present balance of \$307.96 now exceeds your authorized credit limit of \$700.00.

To keep your account in good standing, it is important that the balance be maintained within the established credit limit. Payments larger than the minimum required on your statement should be made so that you may quickly resume the use of our BankAmericard services.

If you have any questions concerning this matter, please do not hesitate to contact us.

Sincerely,

C.K. Leonard  
Manager  
Limit Control Department

REF: 4368 190 344 135  
LADCH2

This letter, sent to Donald Forinash by an automated system, contains a number of misstatements.

Any one of three types of programmed checks could have prevented the issue of this bad output — a check on the existence of the given reference number, a check that \$307.96 really exceeds \$700 or a check that the salutation of the letter matches the addressee's name.



# Mildred the Mugger Confident of Her Professionalism

By Joseph T. Rigo

Special to Computerworld

Mildred, the mugger on my block in New York City, was outraged.

"They keep saying that I'm not a professional," she told me.

"What do you mean?" (I always was a good straight man. It's a small talent, but we have to settle for what we've got.)

"I work hard at my job," she answered. "And I do it well. Eight hours every night. Five nights a week. I only work on tourists, and no one gets hurt."

"What are you talking about?" I asked.

"It's those university professors and the association types," she said. "They keep saying I can't be a professional mugger unless I live and think just like they do."

"So who cares," I answered. "Some of the best people in your business and mine have nothing to do with either of them."

"I care," Mildred answered. "I worked hard to get where I am, and I'd like some respect. It's

important to the children."

I was forced to admit that Mildred has a point. She was the first woman mugger in New York. That wasn't easy.

cards and junk that are tough to replace.

She knew her business, no doubt about it. And she cared about the larger issues.

suggesting things that could be in the test.

"Section I might cover anatomy. You've got to know where it's okay to poke a citizen and what to avoid unless you're serious."

Mildred feels public opinion toward muggers would be better if the new people entering the business knew more about anatomy. A few lab courses would help a lot, she said — kids wouldn't make so many mistakes when they're starting out.

Section II would deal with the law. "It would make sure that a guy knows what his rights are, where to find a good lawyer and how to scare the wits out of a witness," Mildred suggested.

The final section would test street savvy — how to identify a blind alley before you run into it, for example.

A test like that would be fun, Mildred said. The trouble, she feels, is that mugging is a dynamic profession. It changes daily. And anyone who's qualified to make up a good test is too busy on the street to do so.

"There's just no way that you can make as much money on tests as you can lifting wallets," Mildred explained.

Besides, Mildred added, "none of this really has anything to do with professionalism. Some people do great on tests. But you just wouldn't want to have one of them on a job with you."

The only test that really counts, Mildred said, is the one you go through every day wherever you work.

One of her favorite enemies is the president of the American Mugging Society. "He's the one who goes around the country making speeches about how muggers aren't really professionals," she said.

"He learned how to get money from the National Grants Foundation. So he quit his job and went into business for himself. Now he sneers at people who still work the streets. They aren't like he is, so he says they aren't professionals."

"The trouble with these people and their societies is that they don't want to admit a person's profession is what he does to earn a living. They want it to be some spiritually purifying experience, apart from financial considerations, but it isn't."

"They're making speeches, but I'm where the action is. If that's not being a professional, what is?"

## Reader Commentary

What's more, she was good. She got a tourist's cash and she gave him something to talk about when he got home, but she left him with all the credit

Even now, she told me, she takes time to visit the neighborhood school yards. She is proud of the number of little girls who have chosen to follow in her footsteps.

"It just makes you cry," she said.

"The little girls," I asked, "or the professors?"

"All of them," she said. "All those strange people who get government grants to figure out who's a professional and who isn't."

"Oh," I said.

"They say that you can't be a professional unless there's a defined body of knowledge that can be taught in college... unless you have a formal code of ethics... and unless there's some sort of certification or licensing procedure."

I nodded. It seemed I had heard it all before.

I should mention, by the way, that Mildred is a graduate of Brown University. Her parents were, and are, stinking rich. She is a mugger by choice. She absolutely cannot be classified as a victim of society.

As for point one, she said, she and her fellow muggers are too busy on the job to write things down. "You know how it is with documentation," she said.

"Besides," she added, "who wants to pay for courses? If someone comes up with new ideas, you get a job with him, and he pays you to learn how to do it."

"I mean, I went through all that when I was a kid," she said.

Similarly, she said, the code of ethics is no sweat. For starters, she asked, "how about 'Thou shalt not clobber a citizen who hands over his cash without a fuss?'"

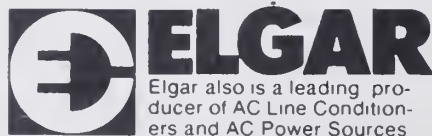
"And you can have as many enforcement committees as you want. No committee is going to dump on a guy whose star is still rising. They only pick on the guys who have already been beaten to a pulp."

On the certification test, Mildred hated to admit it, but she sort of likes that idea. She keeps

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data services company

western union



## A Pair of 135s, DOS/VS and. . .

# Army Calls Put Zing in Israeli Firm's DP Planning

By Nelson D. Scheib

Special to Computerworld

HAIFA, Israel — The Israel Electric Corp. Ltd. is the electric company in Israel, with about 200 employees in the Information Systems Division. These include analysts, programmers, operators and clerical staff.

Our problems are about the same as in many installations, with a few that are unique to Israel — for example, key personnel can be called up for 50 days of reserve army duty in the middle of a critical project.

The electric company has two computer installations. The smaller one is in Tel Aviv; the larger, in Haifa.

Tel Aviv has a 96K IBM 370/135 system with a 2540 reader/punch; 3215 console; four 3420, 9-track dual-density tape drives; three 2314 disk drives; a 1401/N1 printer; and a 1287 optical reader.

All of the accounts receivable work is done in Tel Aviv. The optical reader processes more than one million document/mo, including mark-sensed meter-reading tickets and cash payment stubs.

They print bills, past-due reminders and all of the accounts receivable statistical reports used by management.

Tel Aviv currently operates under DOS/VS with two partitions. In two months the system will be expanded to 192K with six 2314 disk drives. At that time we will be able to operate under Power/VS with four partitions.

In Haifa, we have another 370/135. In the past few weeks the memory was expanded to 256K. Peripheral equipment is the same as in Tel Aviv, except that we already have six 2314s. We also have a pair of printers and two 3270 display terminals. We do not have a 1287 here.

### Bilingual Terminal

All work except accounts receivable (payroll, inventory, civil engineering, net-

work analysis, research and development, etc.) is done in Haifa. The remote terminal types and displays in both English and Hebrew.

We currently operate under DOS/VS and Power with four partitions. Next month we will replace the 2314s with six 3340s. At that time, we will be operating under Power/VS.

Plans for the near future are for eight 3340s which will permit running with five partitions and a larger data base. By the end of next year we will be thinking of a 370/158, exact configuration unknown.

We write programs in Assembler, RPG-II, Cobol D, Fortran-IV, PL/I Optimizer and CICS. To my delight, we are phasing out the use of Cobol.

With CICS we are still in the preliminary stages — building data bases, debugging programs and training operators. Eventually we will have many remote 3270 terminals throughout the company.

We use PCS (IBM's Pert) for new plant construction. PCS has been modified by us to print the reports in Hebrew. Yes, I know that Projacs is available to do the same, but we had PCS first.

Most of the commercial work is done entirely by our staff, from analysis and

programming to preparing and running production. The scientific programming, in general, is done by engineers in the departments involved; they use our facilities primarily as a service bureau.

Present plans call for several sophisticated programs to process the job accounting output from Power/VS. This will not only enable us to more accurately bill the other departments, but will help us determine equipment utilization.

With this we hope to be able to "tune" the system for greater efficiency and also provide data for projecting future expansion needs.

Some of our problems and planned solutions are:

- Storage of source and object decks and the clerical task of determining which decks represent the actual programs being used. Hence our interest in Librarian, Panvalet, and other such packages.

- CPU-bound programs taking control of the system and delaying other work. These programs will be run on the fifth partition, under DOS/VS.

- Backup installations. The computer population in Israel is too small to facilitate two or more companies installing

identical systems. For backup during installation of new equipment or major breakdowns, we must fight for available time at IBM's service bureau in Tel Aviv.

This entails carrying our disks, tapes and cards to the larger system in Tel Aviv. Of course we must insert DEL and ADD cards at IPL time and change ASSGN cards in the jobstreams with all the potentials for error.

Solution? We are working on it.

Nelson Scheib is a senior systems analyst at Israel Electric.

## JCL Maintenance Eased by Editor

FAIRFAX, Va. — Meta-1-JCL from JMP Associates is an editing and formatting program that operates on IBM's OS Job Control Language (JCL) decks and procedures.

The initial coding of JCL can be done using symbolic notation for variable fields such as data set names.

Meta-1-JCL can then be used to replace the symbolic values with real ones and to format the output JCL to installation standards. Test JCL can be generated from production job streams, and vice versa, without recoding and entering each individual change.

With the editor, the programmer need not know the physical locations of parameters to be changed, how many occurrences there are of the change, or what else appears on the same JCL cards.

The JMP utility locates and changes all qualified references to the specified change, the vendor said.

Overflow items are placed on the next output card. Multiple uses of the same character string will not result in erroneous changes, and changes may be made against all submitted JCL or restricted by preceding the change instructions with available qualifiers, the spokesman added.

Output JCL can be formatted in an expanded one item per card mode or condensed with as many items as will fit on each card.

Output sequencing may restart on the occurrence of a JOB, PROC or EXEC statement at the user's option.

Misplaced cards, open parentheses and quotes and invalid keywords are among the JCL errors that can be detected in the input and output phases, the vendor claimed.

Meta-1-JCL is available for \$2,000, including a one-year warranty. Maintenance thereafter is \$240/yr.

JMP Associates is at 3219 Prince William Drive, 22030.

## DEC RT-11 Languages Accessible Under RSTS/E With Link Routine

PORTLAND, Ore. — Users with 48K or larger Digital Equipment Corp. PDP-11s can switch at will between Basic Plus under RSTS/E and Fortran IV or other languages under RT-11 with a package now available from the Oregon Museum of Science and Industry (Omsi).

DEC's RSTS/E is a "true time-sharing system designed to support multiple run-

time systems and multiple languages," Omsi said, but DEC presently provides only one language in that environment.

Omsi-RT allows RSTS/E users to enter RT-11 to use its facilities.

In addition to Fortran IV, RT-11 includes support for Macro-11, a macro-level assembler, and chain file and overlay capabilities. All of these features can be used without change under Omsi-RT.

While Fortran programs can read and write Basic Plus-compatible files, Omsi-RT imposes some limitations on its users. RT-11 real-time and foreground/background supports are not available and programs that do not use standard RT-11 I/O must be modified.

Disks are the only file-structured devices accessible under RT-11, Omsi said, adding that other devices acceptable to RSTS/E may be accessed as nonfile-structured devices under RT-11 (and Omsi-RT).

In addition to having 48K of memory — "but 64K is much better" — users installing Omsi-RT must have binary licenses, software and manuals from DEC for both RSTS/E and RT-11.

The museum's software can be purchased for \$2,350 from Omsi Computing, 4015 S.W. Canyon Road, 97221.

ifying declarations of the paged arrays and inserting a CALL in the paging initialization routine.

There are slight restrictions on the Fortran programs handled by this "virtual" software, Smiley admitted, "but in practice they are unlikely to inconvenience the user."

The paging software currently operates under RDOS only, but versions for other environments will be made available if interest arises, the developer said.

The basic package price of \$500 includes one year's maintenance, Smiley said from Snyder Associates offices at Suite IAB, 500 Sagamore Parkway West, 47906.

## Package Pages Fortran on Nova

WEST LAFAYETTE, Ind. — Users of Data General Nova minis apparently can gain virtual memory support for Fortran array processing — without buying address mapping hardware — by utilizing software developed by Snyder Associates, Inc. and Richard F. Smiley.

The package enhances Data General's Fortran IV run time library so that it now breaks up selected Fortran arrays into 256-word "pages," storing them on a disk file until needed.

A "least recently used" demand-paging algorithm is used to decide which pages should be in core at any time, Smiley explained.

The user activates the feature by mod-

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## Programming of Sycor Units Eased With TAL II

ANN ARBOR, Mich. — Sycor, Inc.'s TAL II, an enhanced version of its Terminal Application Language (TAL), allows local inquiry/response and improved data entry on the recently introduced Model 440 clustered terminal processing system, the Model 350 intelligent terminal and the Model 340 terminal with flexible disk option.

TAL II allows users to write application-tailored editing programs without the table entries that characterized TAL programs.

It can perform arithmetic operations, data movement, logical comparison, range checking, table look-up, field justification, format chaining, check digit verification, field duplication and checking for minus overpunch.

### Eight Forms of I/O

Subroutines and support for I/O to any of eight different sequential, random or indexed files or devices is also part of the

software, Sycor said.

Associated utility routines create and maintain sorted, random or indexed files for access by the TAL II program.

New instructions provide the ability to name programs and field programs, to define overlay statements, to include I/O drivers in the program and to skip to the top of a new page in the source listing.

Other features include a TAL II generator.

Output is either an object program, a generator listing or both. Thus, on the

first generation of a program, running at maximum speed, the user can obtain an error listing. After making corrections, a later generation can be performed to provide a "clean" object program and a corresponding listing.

The package also includes a TAL-to-TAL II translator program.

Output is an equivalent TAL II source program which can be processed by the TAL II generator.

The TAL II program library disk costs \$35 and will be available next month.

## System Design Book Republished

CLEVELAND — Described as "aimed at the second-year college student and also valuable for in-company training programs," a new edition of *Business Systems* is now available from the Association for Systems Management (ASM).

Replacing an earlier text with the same

title, the new book contains nearly 700 pages and 30 chapters.

An instructor's manual is available to teachers, a spokesman noted, adding that the textbook itself can be acquired for \$13.50 from ASM at 24587 Bagley Road, 44138.

## Inventory Package Uses NCR 656 Disk

DAYTON, Ohio — NCR Corp.'s inventory material requirements application package has been adapted for use with the NCR 656 disk.

This means a system in the \$2,500/mo to \$2,700/mo rental range can handle the application; formerly, a system costing over \$4,000/mo was required, NCR said.

The software is free to users of Century CPUs and is available now, NCR noted.

The package helps manufacturers determine components on hand, those needed and the most economical number to purchase when different production schedules are followed.

It provides for review and change of orders and includes a shrinkage factor in addition to scrap factor to determine component requirements. It also reports exception conditions.

Basic hardware required is a 32K Century 101 with two 656 disk units. The application is programmed in Neat/3 Level II and one of three major manufacturing systems offered by the vendor. The others are bill of materials and inventory control.

## Sales Tax Billings Eased by Tape File

KING OF PRUSSIA, Pa. — The National Rental/Sales Tax Rate Directory on magnetic tape, now available from Vertex Systems, Inc., contains the sales and rental tax rates for all state, county and local jurisdictions imposing these taxes throughout the U.S.

Cumulative as well as individual jurisdiction rates are included, Vertex said.

The directory is used by firms in the capital equipment rental and leasing, mail order, distribution and other industries for computing tax liability on billings or collections subject to sales taxes.

Vertex provides monthly maintenance service to the Geo-coded file for all jurisdictions. The tax file on 800 bit/in., 9-track tape is available for \$1,475/year from Vertex at 650 Park Ave., 19406.

## Supervisor Printout Skipped by Utility

LYONS, Ill. — Mini-Dump from General Electronics is a replacement for the IBM translating core dump for DOS users that eliminates the supervisor area of the dump.

Depending upon the size of the supervisor, this amounts to a savings of 5 to 15 pages of printout and the CPU time required to print it, the vendor said.

The printout of supervisor area is available if needed by assigning SYSLSST to disk and using a utility program to print it, a spokesman noted.

Mini-Dump can be installed on any 360 DOS system and is supplied in object form for a one-time charge of \$100.

General Electronics can be reached through P.O. Box 79, 60534.

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# 'Structured Period' Clarifies Logic Breaks in Cobol

By William B. Simmons  
Special to Computerworld

A recent spate of articles and letters has thoroughly described the lack of logical blocking features in Cobol which render it less than ideal as a language for structured programming.

Yet all of them seem to have overlooked one fact: Cobol does have a rudimentary blocking facility — based upon the period.

I think it regrettable that we have tended to gloss over the logical properties of the period. Carelessness in placement of periods is probably one of the leading causes of incorrect branching, unprocessed coding, etc.

The missing period after a READ... AT END, the extraneous one in the middle of a nested IF — these are but two of the countless horror stories that can be attributed to failure to treat the period as a logical element.

It must be emphasized that this is not merely a matter of poor desk checking. The real problem seems to be the

usual placement of the period. The right-hand side of Cobol is ragged and imprecisely located, which makes it

very difficult to inspect visually.

The result is that even good programmers often fail to spot irregular period problems. This may be countered by a concept of my own development, which is elegant in its simplicity.

I call it "the structured period."

In its simplest form, the structured period knows but two rules: (1) every period must occur on a line by itself and (2) the period must appear in column 12 of that line.

Naturally, it is convenient to exempt procedure names and such trivial statements as EXIT, GOBACK, etc. Nor would one want to use a period for every single line of coding. Rather, one would identify blocks of related coding and place a period only after the last line of the block.

Properly used, the structured period has a very beneficial effect upon the appearance of Cobol coding, as illustrated in the accompanying box.

In that case, with a mere four additional lines of coding, we have explicitly indicated the logical breaks and implied branches within the paragraph. There is no ambiguity here.

This method is not without its drawbacks. The combination space before period is nonstandard and may be treated differently by different compilers.

IBM compilers accept this construct but generate a warning message, an acceptable compromise.

The structured period concept deserves careful consideration because it has one simple advantage — it forces the programmer to think where he is placing his periods.

*Simmons is an independent programmer and consultant based in Montreal, Quebec.*

```
000010 TRANSACTION-PROCESS.
000020   READ MASTER-FILE
000030   AT END
000040   MOVE HIGH-VALUES TO MF-KEY
000050   •
000060   ADD 1 TO RECORD-COUNT
000070   MOVE MASTER-KEY TO MF-KEY
000080   •
000090   IF REC-CODE = 'X'
000100     PERFORM EXCEPTION-ROUTINE
000110   ELSE
000120     PERFORM STANDARD-ROUTINE
000130   •
000140   MOVE FIELD-A TO PRT-FIELD-A
000150   MOVE FIELD-B TO PRT-FIELD-B
000160   MOVE FIELD-C TO PRT-FIELD-C
000170   •
000180 END-TRANS-PROCESS.
000190 EXIT.
```

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## Fortran for Intel 8080

ALEXANDRIA, Va. — A two-pass Fortran compiler which executes in any 16K Intel 8080 microprocessor system is now available from Mini-Software, Inc.

A subset of Fortran IV, this compiler supports integer variables that are 5 bytes each and floating-point variables that are 6 bytes each. Floating add time is approximately 2.5 msec, a spokesman said.

The firm can be reached through P.O. Box 7438, 22307.

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## Specialized Carriers Affect User Nets

By Ronald A. Frank  
Of the CW Staff

NEW ORLEANS — About half of telecommunications users feel the advent of the specialized common carriers has affected their relationships with the Bell System.

This is one of the key findings in a survey of user attitudes concerning the specialized carriers. Conducted by Thomas A. Farrell Associates, independent consultants, for MCI Telecommunications Corp., the survey gave an insight into user attitudes relating to all specialized carriers.

Out of 78 users answering the question about their relationships with Bell, 40 said things had changed, with 26 saying treatment from the local Bell company had improved.

At the same time, 14 users indicated relationships with Bell had deteriorated as a result of the specialized carriers.

One San Francisco user was quoted as saying Bell had delayed an installation of equipment in New Jersey and, as a result, he had a loss in the savings expected from switching to a specialized carrier, and "a lot of man-time" was expended to resolve the issue.

Another specialized carrier user in Baltimore said Bell had become more competitive, more responsive and had lowered its prices as a result of the specialized carriers.

Asked whether the specialized carrier services had resulted in paying less to the established carriers, 66 users cited savings ranging from 5% to 50% of the monthly or yearly phone bill. This question was included with an explanation that, in many cases, the user would utilize his savings to get additional services from the specialized carriers.

### Modern Equipment Lure

Several users agreed Bell offered updated equipment when it learned a user

was planning to use specialized carriers. "Bell proposed very modern equipment when they learned we were looking at competitive ideas," a Dallas user said.

Two users in Ohio went further and said Bell was now offering terminal equipment at a lower price than Western Electric while raising line charges to make up for the difference.

One user said he had no doubt Bell had hurried introduction of new offerings as a result of the specialized carriers coming onto the scene. He included Bell Data-phone Digital Service, newer modems and the Dataspeed 40 CRT in his list and

questioned "how soon these products and services would have been available" without the new carriers.

But the same user also saw little hope for lower communications costs in the long run. "Bell is going to retaliate through tariff revisions and, as long as the FCC continues to let Bell raise rates, my corporate communications costs will continue to rise." The savings from using the specialized carriers were being offset by rate increases from Bell, he said.

Farrell Associates is at P.O. Drawer 24010, 70124.

## Datapro Study Offers Overview Of Available POS Equipment

DELRAN, N.J. — Users evaluating any type of point-of-sale (POS) terminals can get an objective overview of available equipment as well as advantages and disadvantages, from a POS study done by Datapro Research Corp.

The study analyzed most major POS terminal applications including supermarkets, retail stores, credit-card authorization, fast food and electronic funds transfer.

There are guidelines for the user concerning the selection of a system, such as the caution that "the user who acquires the front end of a modern POS system had better decide exactly what he wants to do with the resulting data if he hopes to justify the cost of the equipment."

In a discussion on retailing POS systems, the study pointed out that optical or magnetic merchandise tag readers have definite advantages, but these can also "have a major impact on the store, distributor and manufacturer procedures required to prepare the merchandise for

sale."

The improved control which is potentially available to a POS terminal system

POS Equipment Category	Functions Performed	Cost Range
Conventional Cash Register	Cash sale transactions	\$1,200 to \$3,300
Electronic Cash Register	Cash sale transactions	\$2,000 to \$9,000
Cash Register with Computer-Readable Output	Cash sale transactions and sale recording	\$3,500 to \$6,000
Print-Punch or Magnetically Encoded Merchandise Tags	Capture of merchandise data	Printer — \$10,000; Tag reader — \$800 to \$4,000; UPC scanner — \$2,000 to \$22,000
OCR A Merchandise Tag Reader	Capture of merchandise and price data printed in OCR A font	Reader — \$1,000 to \$4,000 Printer — \$200 to \$1,000
Optical Character Reader (OCR)	Cash sale transactions, recording of cash and credit sales, capture of merchandise data	\$50,000 to \$80,000
Credit Card Authorization	Checking of customer credit	\$200 to \$1,600 per terminal
Integrated Point-of-Sale System	All POS functions	\$2,500 to \$10,000 per terminal

Basic Categories of POS Equipment

## TI Option Expands 742 Memory

HOUSTON — Texas Instruments, Inc. (TI) has announced an optional memory expansion feature and an expanded version of the Ticol programming language for the Silent 700 Model 742 programming data terminal.

With the memory expansion option, users can have 10K bytes of read-only memory (ROM) with a number of additional commands not available in the standard 8K bytes of ROM and 4K bytes of random-access memory (RAM) capacity for programming instead of the standard 2K bytes, TI said.

Known as Ticol II, the enhanced programming package is said to expand the type of applications programs users can implement on the Model 742 terminal.

Programs written for the Model 742 before the introduction of the memory-expansion feature and Ticol II will be "100% compatible" with models having the expanded memory and will require no reprogramming, the company said. In addition, Silent 700 Model 742 data terminals presently in use can be field-upgraded with the memory-expansion feature.

Purchase price for this memory expansion package, including the extended Ticol II instruction set, is \$495 for factory installation and \$625 for field installation. The lease rate is approximately \$20/mo. The expansion will be available for delivery in October.

The company address is Box 1444, 77001.

user is dependent on the effective operation of an in-store processor equipped with specialized POS software, the report said. "The high development cost and limited availability of suitable software makes this critical area the weak link in many current systems."

The ultimate form of terminals are part of what the study called the integrated POS system. This is described as including self-contained terminals or dual processors for continuous operation, communications with a CPU in "combined batch/real-time mode," modular features for easy expansion, no special merchandise tags required and gradual phasing in

with minimal store disruption.

This type of integrated system is still evolving from basically a key entry system to eventual automatic tag reading systems in retail stores, the study said.

The report assigned a price range and listed the major advantages and disadvantages of eight basic categories of POS equipment.

The POS study is supplemented with a monthly POS newsletter. Both publications are available through September at an introductory price of \$190, a Datapro spokesman said. The newsletter alone costs \$42/year. Datapro is at 1805 Underwood Blvd., 08075.

## AT&T Asks for Hike

WASHINGTON, D.C. — Short-distance, private-line rates for users operating across state boundaries will go up from 11% to 18% on October 9.

That is the rate increase proposed by AT&T to the Federal Communications Commission (FCC) for interstate private lines up to 25 miles. The increases would affect all Bell Series 2000 and Series 3000 private lines and would include higher charges for foreign exchange (FX) and non-FX station terminal, channel terminal and the inter-exchange mileage.

Station terminal rates for FX users would go up from \$10.50/mo to \$11.50/mo, and for non-FX users from \$15.75/mo to \$16.75/mo. Channel terminal rates would go from \$3.15/mo to \$4.15/mo. The inter-exchange mileage charge would be raised from \$3.15/mile per month to \$3.75/mile per month up to 25 miles.

AT&T said the increases would range from \$4.60/mo for a one-mile link to \$19/mo for a 25-mile link.



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# Communications Net Saves Metal Firm \$85,000/Year

RICHMOND, Va. — Reynolds Metals Co. has established a data communications system to handle order entry, order status inquiries, statistical reports and administrative messages.

According to Terry Martin, manager of telecommunications systems at Reynolds, the network requires some 10 different types of terminals. Equipment ranges from Model 28 teletypewriters operating at 10 char./sec over Western Union private lines to binary-synchronous terminals communicating at 1,200- and 2,400 bit/sec over the dial-up network and up to 9,600 bit/sec on private lines. There are over 200 terminals in the network.

Approximately 20,000 messages are transmitted each day throughout the network. Wiltek remote-batch terminals are now handling some 10,000 messages — half the total load.

Since Wiltek's Model 300 and Model 400 buffered terminals replaced most of the slower paper-tape equipment, overall traffic volume has increased 15%, while savings are approximately \$85,000/year as a result of the change, Martin said.

Among the drawbacks of the older equipment were: high cost of private,

leased lines; operator difficulty with slow, manual preparation of paper tape; lack of error control in the asynchronous line; slow transmission speed (100 bit/sec); and little flexibility for future upgrades.

The terminals transmit data in a bisync mode at a speed of 1,200 bit/sec over voice-grade Wats lines. Both the Model 300 and Model 400 terminals are a combination teletypewriter and hard-copy printer.

The terminal base contains a modem, communications control unit (CCU) and two magnetic-tape buffer stores. One buffer provides storage for send traffic, the other for receive traffic. Each buffer can store up to 50,000 characters.

## Terminal Transactions

The traffic load within the Reynolds network is composed of approximately 60% administrative messages and order status reports, 30% order entry, and 10%



Operator at Reynolds sales office in Los Angeles checks printout from Model 400 teletypewriter terminal.

statistical data.

Statistical data originates from Reynolds' IBM System 370 mainframe, which provides all offices with formatted reports.

A Wells T-578 message switch (originally manufactured by Wells TP Sciences, now Graphic Scanning) front-ends an IBM System 360 mainframe. The Wells switch acts as a store-and-forward processor, with the 370 providing 2311 disk storage for either emergency backup or to give access to sales order information and statistical data stored in the main memory.

All terminals in the Reynolds network can communicate with each other. Eventually, all the terminals will handle on-line inquiries to the IBM systems.

Reynolds presently is using five out-Wats bands for the terminal operation, loading 16 to 17 terminals on each band.

The Wells switch polls each terminal every 22 minutes.

Operating one of the buffered terminals is simplified because data transmission proceeds independently of the operator. With a switch, the operator either can type data directly into the terminal's send buffer for temporary storage or obtain a printout of messages stored in the terminal's receive buffer.

Since the store-and-forward switch controls data going to and from the magnetic-tape buffers, the operator can continue to enter data uninterrupted until the send buffer registers full.

The changeover to buffered terminals has provided Reynolds with error-free transmission of data, high-speed communications over the dial-up network, a flexible system which can accommodate future expansion, and lower communications system costs, according to Martin.

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## Harris Adds Remote-Batch Unit

DALLAS — Harris Corp. has an addition to its 1600 family of remote communications terminals designed to provide entry-level remote-batch capabilities.

The Harris 1606 remote-batch terminal is for small- to medium-volume batch users requiring emulation of IBM 2780/3780 protocols.

"As their requirements increase, users can take advantage of the wider choice of

the peripherals and applications flexibility offered by the Harris 1610 and 1620 systems," a company spokesman said.

The 1606 is furnished with a 16-bit, byte-oriented processor, 2,000- to 4,800 bit/sec synchronous communications interface, 300 line/min, 64-character-set chain printer, and 150 card/min reader. Standard printer features include 132 print positions, 6- or 8 line/in., Ebcidic and Ascii (64 characters).

In this configuration, the terminal will be priced at \$820/mo, including maintenance, on a 12-month lease.

Options for the 1606 include a 300 card/min reader and a static eliminator and paper/puller stacker for the printer.

The 1606 is said to include provision for IBM Synchronous Data Link Control designed into its hardware, and flexible disk support will provide mass storage auto-load, intermediate storage and input/output spooling capabilities. Print quality is achieved through use of a chain-train printer, the firm said.

First deliveries are slated for September from 11262 Indian Trail, Box 44076, 75234.

## TT201C Modem From Syntech Comparable to Bell 201C

ROCKVILLE, Md. — Syntech Corp. has a Bell-type 201C modem that is described as end-to-end-compatible with comparable telephone company data sets.

Called the TT201C, the unit operates at 2,000- or 2,400 bit/sec over either dial-up synthesized circuitry which operates over two-wire and four-wire facilities.

Automatic loop-back tests can be initiated with a transponder that costs \$175 or \$8.75/mo on a two-year lease. The modem costs \$1,095 or \$55/mo on a two-year lease from 11810 Parklawn Drive, 20852.

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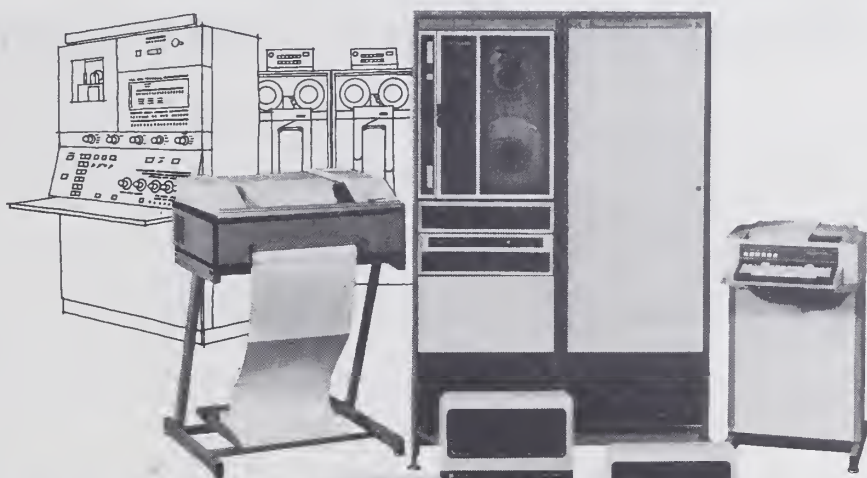
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## Announcing the EDP Seminar Series Fall Schedule

The world of EDP is caught up in a continuous revolution. It's only 24 years since the first business computer made its appearance, and we've gone from tubes, batch processing and single-site giants to multiprogramming, time sharing, data communications, giant minicomputers and hundreds of other technological innovations that were unheard of only recently. Keeping up with this revolution is difficult, to say the least. And that's why we've created the EDP Seminar Series.

The EDP Seminar Series gives you practical applications of the newest advances in computer management. What you learn will save you time and money, because each course is geared to practical dollars and sense application.

Remember, these are seminars, not lectures, and you'll be learning by doing in a shirtsleeve atmosphere. Workshops are an important feature of the Seminars, and round table discussions and shop talk luncheons complement the seminar presentations. The workbooks and course materials are yours to keep, so you'll always have a handy reference to all you've learned.

We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

### Data Communications Course #1010 — Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is \$350. Additional registrants from the same company qualify for the reduced rate of \$300.

San Diego	Plaza Int'l Hotel	Sept. 29-30
New York	St. Moritz	Oct. 13-14
San Francisco	Dunfey's Royal Coach	Oct. 20-21
Miami	Marriott Miami Beach	Nov. 17-18

### Data Communications Course #1020 — Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is \$450. Additional registrants from the same company qualify for a reduced rate of \$400.

Miami	Holiday Inn Airport Lakes	Dec. 1-3
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### Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is \$325. Additional registrants from the same company are charged only \$275.

New York	Summit Hotel	Oct. 22-24
San Francisco	Hyatt Regency San Francisco	Nov. 12-14
Chicago	Hyatt Regency O'Hare	Nov. 19-21

### How to Draft Effective Legal Agreements

This one-day seminar is a complete workshop for non-legal, technical people who may be called upon to draft legal agreements for their company. Also led by Roy Freed, this seminar covers a variety of formal agreements, their structure and the legal factors involved. You'll have all the basic skills necessary to write legal agreements, and you'll be able to spot items that really require the attention of lawyers.

Cost for the seminar, including luncheon and a complete workbook on the subject, is \$135.

New York	St. Moritz	Oct. 8
Boston	Sheraton	Oct. 15

### Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is \$350. Additional registrants from the same company qualify for a reduced rate of \$300.

New York	St. Moritz	Sept. 22-24
Denver	Denver Hilton	Dec. 1-3

### Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is \$250.

New York	Summit Hotel	Sept. 29-30
Wash., D.C.	Marriott at Wash. Int'l. Airport	Oct. 20-21
Chicago	Hyatt Regency O'Hare	Oct. 27-28
San Francisco	Dunfey's Royal Coach	Jan. 19-20

### How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is \$300. Additional registrants from the same company are charged only \$250.

New York	St. Moritz	Oct. 6-7
San Francisco	Berkeley Marriott	Nov. 10-11



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## Hardware Monitors Cut State's Upgrade Requests

By Edward J. Bride  
Special to Computerworld

LACONIA, N.H. — Before a Michigan state agency can order an upgrade or additional CPU, the state's Bureau of Management Sciences first brings in a hardware monitor to check for weaknesses, overloads or bottlenecks in the existing system.

The state even writes a clause into its contracts requiring vendors to cooperate in the monitoring efforts.

At the top of the list of the bureau's successes is a \$412,000 savings resulting from a \$65,000 hardware monitor investment, Paul Roscher, assistant director of the bureau, told a seminar session at the recent National Association of State Information Systems (Nasis) conference here.

Recalling the request for a fourth processor at a welfare DP center because of a growing data base,

Roscher said a hardware monitor was used on the system and the probes disclosed areas where software could be modified to reduce run times, delaying for a whole year a planned upgrade.

The state has adopted the hardware approach to computer performance evaluation (CPE) because most of the commercial software available today is oriented toward IBM gear, and five of the eight Michigan DP centers use Burroughs Corp. equipment, Roscher commented.

The state now uses the monitor, a Compress Dyna-probe system comprised of the Dynaprobe 7900 and 8000 systems, whenever one of the centers requests new equipment, he noted.

Aside from the obvious benefit of cost avoidance, Roscher noted, the use of CPE techniques accelerates the process of replacing hardware that is deemed inadequate.

Output from the monitor demonstrates precise needs to the legislature or other approving bodies, he explained, adding that "intuitive judgment" has been eliminated as part of the acquisition process.

"We have reduced the number of requests for new hardware," he said, "and those that do come in are more professional."

In one case, monitoring disclosed that removing parts of the operating system from core memory could alleviate a processor-bound application, speeding up the run time and delaying an upgrade, he said.

The state has assigned the full-time monitoring function to one individual, and the system is transported to the centers where additional equipment has been requested, he noted.

The monitor is currently busy eight out of 12 months, "and we're just getting started," he added.

(Continued on Page 22)

### Bits & Pieces

#### IRS Accepts Microfiche Of Cash Books, Ledgers

WASHINGTON, D.C. — Corporations and other taxpayers can now keep general books of account solely on microfiche or microfilm, according to a recent Internal Revenue Service (IRS) decision.

The IRS previously required hard copy for cash books and ledgers, but accepted microfilm for canceled checks, invoices and the like.

COM users who wish to keep their general books of accounts on COM alone must first describe their micrographic system to their IRS district director.

The information should show how the system conforms with IRS microfilming requirements set forth in Revenue Procedure 75-33.

#### Easy-Load Cartridges Clean, Rewind

BURLINGTON, Mass. — Users of self-threading Easy-Load types of tape cartridges can clean and precision-rewind those tapes on the Model 1011 tape cleaner/rewinder from Computer-Link Corp.

The device offers dual-blade/dual-pass cleaning and dual capstans for positive tension control during both forward and reverse tape cleaning passes, the company said.

The Model 1011 costs \$2,200 from the firm at 14 Cambridge St., 01803.

#### Correction

SAN FRANCISCO — Intel add-on memory for the IBM 370/158 using 4K random-access memory (RAM) was accepted by IBM in June. National Semiconductor Corp. manufactures the memory.

## 'Mavis' Has Answer for Billing Company

By Patrick Ward  
Of the CW Staff

MARYLAND HEIGHTS, Mo. — A service bureau handling billing for over 1,000 doctors recently decided the U.S. Postal Service just was not fast enough, so it replaced key-to-disk entry of data brought by the mail with a voice response system that collects data clients key into Touch-Tone phones.

The Data Service Agency (DSA) receives daily billing information from participating doctors and dentists all over the country. It mails back an updated report on the doctors' accounts the same day and also bills patients and returns management reports to the doctors on a cycle basis.

DSA did not run into delays in receiving mailed data from clients in the nearby St. Louis area. But as the firm expanded nationwide, the lag in receiving data became more of a problem.

"We faced an increasing need to capture patient transactions quickly to improve the doctors' cash flow," Norton Esrock, the firm's president, explained.

DSA also wanted to provide a service that would take the billing out of the doctors' office, but still allow doctors to look up a patient's balance as if all the recordkeeping were still done on their own premises.

DSA's answer was to install a 128K McDonnell Douglas Automated Voice Information System (Mavis) in June of 1974.

"Using Mavis, the doctor's office now enters patient transactions directly via Touch-Tone telephone with Mavis providing vocal prompting and validation," Esrock said. These transactions are stored on an IBM-compatible, 2314-type disk and transferred each night to our IBM 360/50 for processing.

"This capability," Esrock added, "pro-

vides the doctor with an up-to-date accounts receivable ledger at all times."

Mavis also operates in an inquiry mode, Esrock said. "With the current patient files resident, Mavis can respond vocally to inquiries on a patient's account balance."

"This is especially useful during a patient's office visit," he explained.

For example, the doctor's office can call Mavis, enter the patient's account number and Mavis "tells" the patient's balance, delinquency status and any charges or payments since the last billing date.

Most of the doctors' offices have been able to use Mavis with little or no training. Mavis can provide an "echo" data entry mode for new users that repeats what has just been keyed in through the Touch-Tone phone.

Once users are familiar with the system, they can dispense with the repetitions. In either mode, however, Mavis asks for a security code and steps the user through the data entry process.

After the user has keyed in several

records, Mavis "reads" back a batch total. DSA also returns the daily report's listing of each day's new billings to the doctor's office within a few days, Esrock noted.

DSA operates Mavis 24 hours a day, seven days a week. The voice response system consists of a 128K processor unit and 2314-equivalent disk, four In-Wats and two local phone lines and an 85-word vocabulary.

McDonnell Douglas Electronics Co. (MDEC) developed the software and vocabulary for DSA's Mavis application.

This fall, DSA plans to replace its 16-station Four Phase key-to-disk system with a smaller number of CRTs on-line to Mavis.

The CRTs will provide the in-house key entry for those clients who are still mailing data from their offices.

Though all DSA customers can use Mavis for inquiries, DSA has only recently offered Mavis as a data entry service. Therefore, its impact on data entry costs has yet to be established.

## Greyhound Adds Printer

PHOENIX — Greyhound Computer Corp. has enhanced the recently announced Phoenix I/O Subsystem by adding the PTR3 1,500 line/min printer.

The subsystem is currently available only to users of IBM 360s and 370s leased from Greyhound.

The PTR3 utilizes a horizontally operating print train-like character bank that is operator-changeable. All standard characters of IBM's Universal Character Set are included in the 384-character train.

Monthly rental (including principle period of maintenance) for a one-year lease term of the I/O Subsystem with PTR3, M-1000 card reader, P-100 card punch and Control Unit is \$2,665. Purchase price is \$77,357.

Monthly rental for the same configuration with two PTR3 printers is \$4,233 on a one-year lease term. Purchase price is \$124,395.

Lease terms of two, three, four and five years are available at reduced monthly rentals, Greyhound said from Greyhound Tower, 85077.



### THE ULTIMATE DATA COMPRESSION FOR ALL 360/370 USERS

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SHRINK's compression rates average from 20 to 85%. Here are some sample benchmark results of SHRINK's compression.

Previously compacted files with much binary data	20-30%
OS object decks	43%
Report type data files	70-85%
File data consisting of alphanumeric numeric and some binary items	60-80%

Compression/expansion is highly efficient requiring an average of only 1 CPU second per 100K bytes on a S/370/158. Sophisticated redundancy checking assures data integrity.

CPU overhead is minimized in random keyed retrievals and in transaction/master matching as only selected records need expansion. Further, compressed files can be sorted directly, reducing sort times and sort work space. SHRINK will speed up I/O bound jobs by permitting more records per block size and fewer volumes per file. SHRINK is easy to use from any batch or on-line program. Installation and training takes an hour. A no obligation trial is available.

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## Disabled Enter Data by Voice With SEI Unit

RESTON, Va. — Quadriplegics and other severely disabled persons can tell a computer what to do with a voice data entry system from Scope Electronics, Inc. (SEI).

The Vdets 1000 is a terminal device that converts spoken utterances to machine-readable code.

Input can be in the form of words or short phrases, and the output is in standard Ascii code, which may be used to enter data into a computer, retrieve stored information or control machine operations.

The \$15,000 system includes microphone input; a 16-character buffer read-out of the command the user gives the



Mike Zara uses the SEI Vdets 1000 system to take a programming training course in his home.

CPU; and the voice command recognition system with analog-to-digital converter. SEI is at 1860 Michael Faraday Drive, 22090.

## Hardware Monitors Reduce Upgrade Bids From Michigan DPers

(Continued from Page 21)

A typical monitoring project may take 10 to 12 weeks, with only one or two weeks actually spent in the probing, he noted.

The first step, which normally takes a week, involves interviews and consultation with data center management to determine the content of the study and establish liaison with other participating data center and vendor personnel, he said.

Then, a week is spent developing hypotheses for the study, developing probe point locations, installing the monitoring equipment and verifying probe logic.

There may be as few as five days or as many as 10 days of actual monitoring, depending on the conditions of the equipment itself, number of processors, sophistication of applications being run, and so on.

Software processing of monitored information is done concurrently with the monitoring, he noted.

The last steps in the monitoring project take one to three weeks, and these involve analysis of reports, data center consultations and preparation of the final report for the data center manager, he reported.

The hardware is installed so as not to noticeably affect data center operations, he said. In fact, this is one additional reason the state prefers hardware; software monitors "steal" cycles and cause system overhead, he noted.

System improvement is not the only goal of CPE, according to Roscher. The Bureau of Management Sciences provides a monitoring service on request of data center managers in several other instances.

The monitoring service may be provided, he continued, after major new systems are implemented, after an upgrade or removal of equipment, after "radical workload changes" and periodically "for projecting growth."

These subsequent measuring projects can be conducted in much shorter periods of time, one to three weeks typically, since the hypotheses, probe points and other information would already be known, he said.

### State CPE Manual

The Department of Management and Budget's administrative manual outlined CPE procedures for state agencies.

The manual noted that "vendor personnel liaison is essential" to "ensure study accuracy."

The state's performance analyst "works closely with vendor field engineers to locate probe points," the manual said.

The actual attachment and detachment is done by the vendor's field engineering personnel during preventative maintenance periods, to "prevent any impact on actual operation."

While hardware monitors pinpoint general areas for improvement, software monitors can provide more specific data on applications, program bugs and other areas to improve run times, according to another speaker.

Software monitors "look more directly at the software problem," said Oliver Smoot, vice-president of the Computers and Business Equipment Manufacturers Association (Cbema).

As a balance to an all-hardware or all-software approach to CPE, Smoot advised users to "use the correct approach for the type of problem you have."

Attendees seemed to feel, however, that a hardware monitor was the best first step to determine which problems need attention.

Bride is vice-president of editorial services at The Conference Company, a division of Computerworld, Inc.

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trains throughout the system—and of each car passing through that particular terminal. And INCOTERM eases the transmission of administrative messages between Chicago and other points in the system by minimizing line time.

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## With Shutdown Penalties Costly

# Power Support Devices Finally Getting Due Recognition

By Lee Cooper  
Special to Computerworld

Power support equipment is finally being recognized as an important and necessary adjunct to the successful operation of computer facilities and communications networks.

No longer can any facilities manager assume his incoming utility power is as stable as the rock of Gibraltar and does not merit his attention. The penalties he may have paid in costly shutdowns brought about by power disturbances are not easily forgotten.

The prospects of future shutdowns in the face of growing energy shortages and planned expansion of computing hardware creates a vulnerability that cannot easily be overlooked.

In early 1971 Programmed Power, Inc.

made a survey of users and prospective users of uninterruptible power sources (UPS). It showed users were extremely naive about their vulnerability to power failures.

Most current or prospective UPS users then had very critical on-line applications. These users simply could not take a chance their equipment would go down because of power disturbances.

A small percentage of other computer users had installed UPS as a result of "scare tactics," willingly supplied by aggressive UPS salesmen, without knowing whether the quality of incoming power was sufficiently unpredictable to warrant the installation of UPS. Power line monitoring was seldom performed and, at best, results were often misleading because most power monitors were incapable of

detecting all of the disturbances which could cause equipment to malfunction.

### User's Best Course

The user's best course is to first try a reliable power line disturbance monitor which is simple to operate and will record all the relevant disturbance information in a way everyone can understand.

This serves to differentiate between those computer problems caused by bad power and those due to other factors; it also stops the finger pointing among the equipment manufacturer, the utility and the computer user.

This record of the incoming power quality serves as a basis for determining whether or not a power problem truly exists and, if so, a justification for buying corrective equipment.

Second, the user should look for a UPS that offers efficiency of operation without sacrificing reliability and cost.

When a user acquires a UPS, he should know low efficiency of operation in a UPS is translatable into heat loss. Electrical energy is used up generating this wasted heat and more electrical energy is required to run the air-conditioning equipment to remove it.

Excessive heat is also the enemy of component reliability and, thus, systems reliability.

### Plan for Efficiency

Efficiency became an important consideration in a recent procurement of 75 Kwh consumed in heat loss over a three-Social Security Administration (SSA) for use with its IBM 370/168 computers.

In essence, SSA deducted from the selling price an average of approximately \$760 for each percent the tested equipment efficiency fell below that proposed by the supplier.

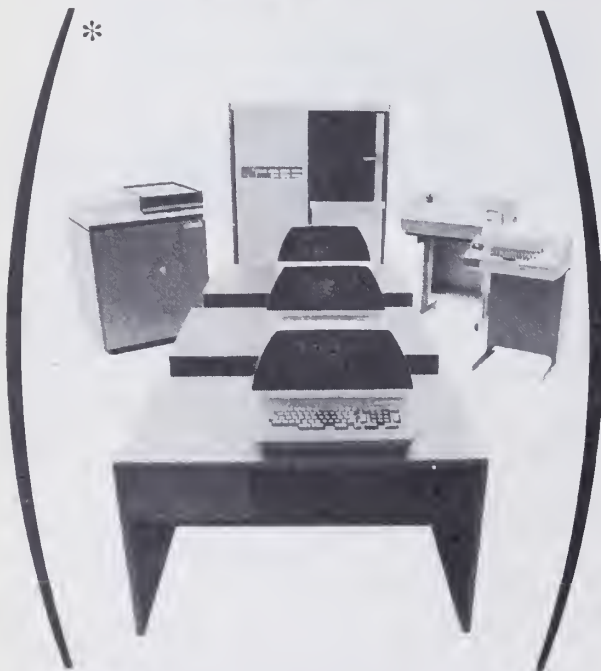
This figure was based on the cost of the extra electrical energy (figured at 3 cent/Kwh) consumed in heat loss over a three-year period of operation. While it chose not to, SSA might have added another 33.3%, or \$253, to cover the air-conditioning cost for removing the heat.

Further, instead of using a three-year base, it might have used a 5-, 10- or 15-year base which would have come much closer to the actual useful life of the frequency converters.

Also, no consideration in the SSA's formula related to the reduction in reliability and consequent repair and service caused by unnecessary heat stemming from low efficiency of operations.

Cooper is with Programmed Power, Inc.

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How efficient it is (average of 80% reduction in errors — 35% to 85% faster document handling). How reliable it is (less than 1% downtime). How simple it is (operator training time less than 8 hours). Or how economical it is (10% to 40% savings in data preparation costs).

And our competitors have loved us for keeping it such a secret!

**The GCS 2100 is a complete data entry system:** it lets you collect and edit data at the source (data is actually edited while it is being keyed); store the data on disc; then transfer the clean data to an output media like magnetic tape. (Data already on tape or cards can be

re-submitted to the GCS 2100 for editing, reformatting, etc.)

The GCS 2100 can interface up to thirty-two telephone lines. Card readers. Medium and high speed line printers. Four-tape drives. Four fixed or moving head discs.

All on a single system.

The GCS 2100 provides extensive I/O functions so you can transfer data to and from disc storage and other I/O devices.

**The GCS 2100 can accommodate up to 64 local or remote terminals:** local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying.

The GCS 2100 also offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line).

**A Programmable Extension Package (PEP) extends the power and the flexibility of the 2100 system:** up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion; and data dependent format switching.

These tables are not job assigned, so they can be used on several different jobs.

A library of over 100 special edits is also available. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

**GCS 2100 Peripherals:** GCS DataTone — data entry via Touch-Tone® telephones. GCS DataTel — remote batch communications.

For more Great Computer Secrets, contact Tom O'Brien, Director of Domestic Sales at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. (800) 527-2568/9 toll free. In Texas (214) 233-5800.

## System Determines Location of Carwash

PORTLAND, Ore. — Your favorite car wash may not be where it is just because the owner had a hunch about the site.

Hanna Industries, one of the largest automatic car wash equipment manufacturers, uses a computer to do a detailed site analysis of the locations where a customer proposes to establish a car wash.

Using an IBM 370/125, Hanna inputs information on the traffic (commuter, shopper), average traffic speed, the visibility of the location and the lot itself, the zoning in effect, the accessibility of the property to passing motorists and other factors.

The result is a forecast of the potential number of cars that will use the car wash daily and monthly. The system also calculates projected overhead and then develops a profitability factor, according to a spokesman for the firm.

Based on the potential profitability factor calculated by the computer, Hanna Industries can recommend installation of one of six different automatic car wash systems at the site.



**'You Have Pushed the Wrong Buttons — Hang Your Head and Try Again.'**

See us at info75

**GCS 2100**  
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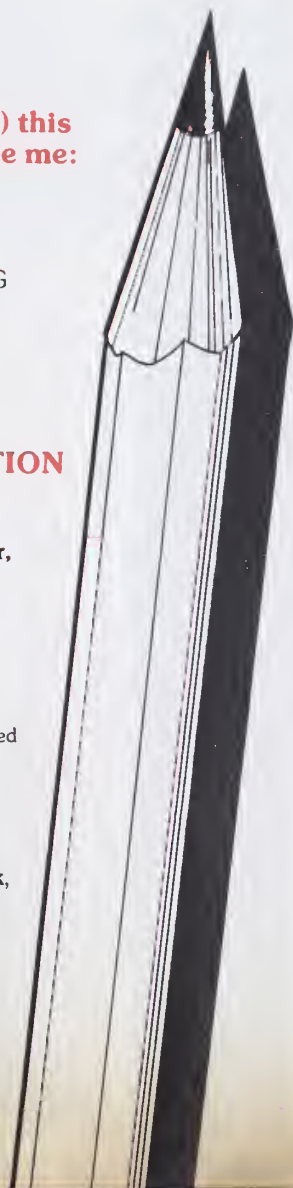
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| 80 | Wholesale/Retail Trade                              |
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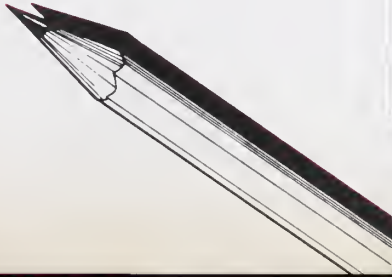
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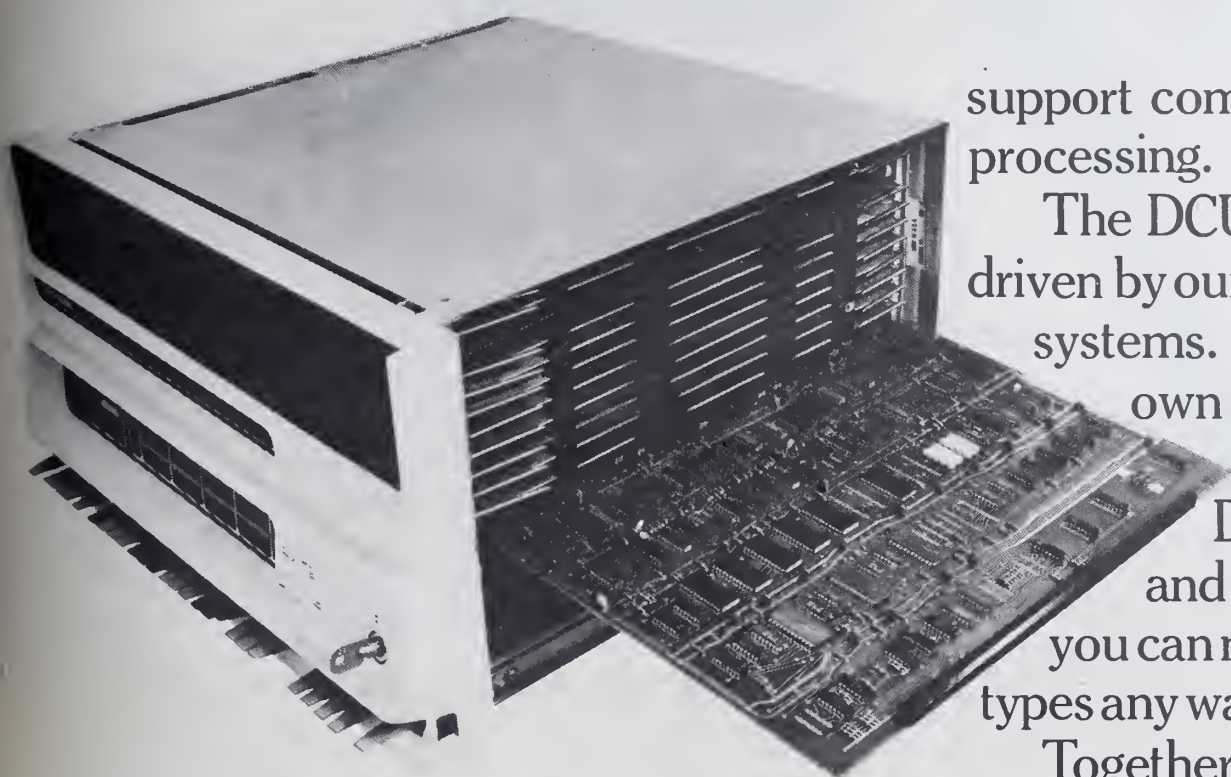
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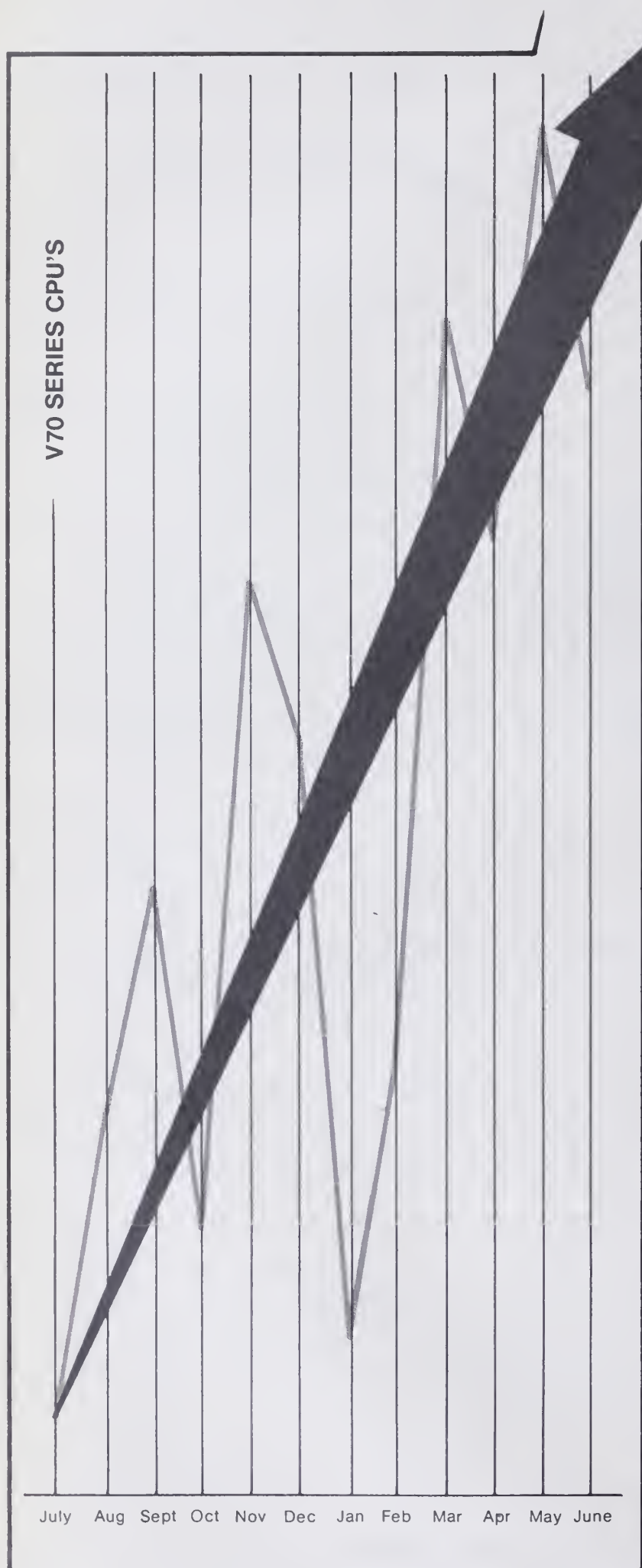
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## Mini Bits

### DEC Datasystem 310 Matched to RK05 Disk

MAYNARD, Mass. — Digital Equipment Corp. has added its RK05 cartridge disk storage as an option for the Datasystem 310.

The option adds 3.2M characters of on-line storage to the Datasystem 310 and consists of an RK05 cartridge disk drive, disk controller and cabinet at a price of \$8,800.

Up to three additional drives can be added at a price of \$5,100 each.

### Micos Gets Disk System

ELMSFORD, N.Y. — Mini-computer Systems, Inc. has added a moving-head disk system to its Micos minicomputer system.

The system consists of one Control Data Corp. 9760 or 9762 drive, one controller, two packs, cables, documentation and diagnostic software.

Up to four drives may be employed with a single controller. In addition, two controllers can be interconnected to provide access by two computers to a common disk or series of disks.

Each removable pack has a storage capacity of 40M bytes for the Model 9760 drive and 80M bytes for the Model 9762.

With the 9760 drive, the price is \$22,000 for the first drive and \$12,000 for each added drive. With Model 9762, the price is \$25,000 for the first drive and \$14,000 for each added drive.

The company is at 525 Executive Blvd., 10523.

### Adapso Holds Seminar

MONTVALE, N.J. — After nearly 100 persons attended its first seminar on small business computers and how they relate to data center operations, the Association of Data Processing Service Organizations (Adapso) has scheduled a second meeting in Dallas Sept. 29-30.

Cost is \$85 for Adapso members, \$110 for nonmembers.

Adapso is at 210 Summit Ave., 07645.

### Correction

The price of Mini-Computer Systems' payroll package and turnkey system is \$55,000 [CW, July 30].

## CDC Offers New Life For System 17 CPU

MINNEAPOLIS — A floating-point hardware unit that operates 10 to 20 times faster than the software it replaces and two types of communications controllers have been announced by Control Data Corp. for the firm's System 17 computers.

The company also introduced a group of card, magnetic and paper tape peripherals, a real-time clock and digital-to-analog conversion devices for use with the System 17.

The purpose of the enhancements, according to the company, is to broaden capabilities of the System 17 in scientific and on-line data processing environments and to provide standard, lower cost minicomputer peripherals that meet the specialized requirements of a growing number of worldwide users.

The System 17 family, announced in 1973, consists of two CPUs with 600- or 900-nsec cycle times and 4K to 64K words of central memory. Basic CPU price, including 4K memory and operator's panel, is under \$15,000.

### Floating-Point Hardware

The CDC 1781 floating-point hardware unit, priced at \$9,700, includes an arithmetic processor and command interpreter. It can be operated in either single-precision (32-bit operand) or double-precision (48-bit) modes.

Benchmark tests have shown the 1781 provides performance improvements of approximately 10 times in single-precision mode and 20 times in double-precision mode over the software interpreters it replaces, CDC claimed.

The hardware requires no changes to existing user programs because it interprets and executes the same calling sequences as those used by the software, the company noted.

CDC's 1743 series communications controllers handle either synchronous (Model 1743-1) or asynchronous (1743-2) full- or half-duplex transmission and are compatible with either RS-232C or CCITT V24 communications protocols.

These units replace stand-alone multiplexers, controllers and special equipment previously offered with the System 17. The

1743-1 is priced at \$2,600; the 1743-2 is \$2,950.

Controller logic is contained on a single printed circuit board that plugs into one channel position in the 600- or 900-nsec System 17 model. The synchronous controller handles 1,200 bit/sec to 19.2 kbit/sec data transmission and includes two line adapters; eight adapters are standard with the asynchronous 110- to 9,600 bit/sec unit.

### Remote Interfaces

Users with industrial control, data acquisition and medical ap-

(Continued on Page 29)

## Outclassed 1130s, Too

## 'We Tried a 370, But Minis Did Better'

DENVER — Now it can be told. At least one computer service company here has discovered that minicomputers can be their salvation — in a DP sense, if not ecclesiastically.

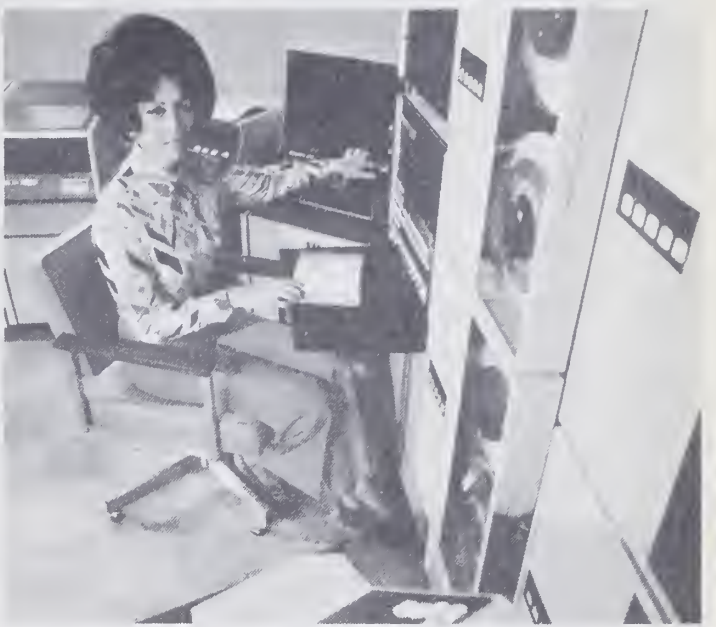
Located in what was once the Episcopal Diocesan Center, Machine Payroll Accounting Services, Inc. (MPAS) found the answer to its prayers for DP efficiency in two minicomputer-based systems.

Started in 1957 to handle payroll accounting services for several small clients, MPAS has grown into a nationwide, full-service operation with more than 450 clients. In addition to providing proof and transmittal sheets and final printed checks for customers, MPAS also supplies all the quarterly reports for filing with the Federal Government and W-2 forms for employees. Last year alone, more than 80,000 W-2 forms were processed.

MPAS also handles the posting of all Series E savings bonds for over 4,000 people in the state and time and billing accounting for several area accounting and law firms.

"The growth in our business was paralleled by an increase in requirements for DP power," Doug McDonald, MPAS founder and president, recalled.

"At first, everything was done manually. Then in 1964 we leased IBM 6420 unit record



Peripherals Make System 17 More of a System.

equipment that used magnetic ledger cards. This enabled us to process more than 35,000 ledger entries per month.

"By 1967 we needed more power, so we leased two 8K IBM 1130s because these systems were consistently beating the performance of IBM 360/65 systems at that time," McDonald said.

But by 1973, the firm was in the old capacity bind again, mainly because we could only accommodate 30 client files per disk pack.

"We looked at General Automation's DMS systems as possible replacements for the 1130s, but the umbilical cord was too strong. So we leased an IBM 370/125 and started to convert our software."

### Minis to the Rescue

After 14 months of paying \$10,300/mo average leasing cost for the 370 and \$86,000 in programming development expenditures, MPAS was in trouble.

In addition to cost overruns, production had dropped drastically. The nine-hour shift needed to get the work out with the 1130s had become 15 or more hours with the 370. And the squeeze was so tight no new business could be added.

Don Rhodes, systems analyst at MPAS, suggested another look at minicomputers. Previous experience led him to choose two

systems based on SPC-16/65 processors from General Automation.

These were delivered on Dec. 20, 1974. The compilers were modified to accept integer and double integer instead of floating-point formats, and they were up and running, making money, on Jan. 2.

According to Rhodes, one processor includes 64K of memory and the other 32K. Each features an arithmetic processing unit that provides functions such as hardware multiply/divide, an automatic bus transfer unit and a computer-to-computer interface.

The smaller system includes a 2.5M-byte disk, an 800 bit/in. magnetic tape unit and a 600 line/min printer. The larger system includes a 100M-byte disk, a 1,600 bit/in. magnetic tape unit, two 600 line/min printers, a card reader/punch and a 32-channel communications multiplexer which presently serves eight on-line CRTs.

"This equipment costs us about \$6,000/mo, just about what our 1130s were costing over a year ago," McDonald said. "But the added power of the systems has allowed us to look for new customers and even explore entirely new business areas."

For example, MPAS has begun an automated burglary and fire

(Continued on Page 29)

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## Graphics System Contains Nova

SAN DIEGO, Calif. — A graphics display system from Megatek Corp. contains an 8K Data General Nova 2/4 minicomputer, a 19-in. large-screen display and a full Ascii keyboard.

Options with the Megraphic 6000 include a hardware character generator, an interactive data tablet and a real-time clock, in addition to a full line of Nova peripherals including synchronous and asynchronous communications ports, magnetic tapes, floppy disks and disk pack drives.

The heart of the system is the BP-752 graphics processor which is capable of displaying 6,000 flicker-free points and/or vectors with a full screen resolution of  $\pm 0.5\%$ , Megatek said.

The unit operates from a core-based display list which accepts either two-word absolute vector or single-word relative vector elements.

A Jump-to-Subroutine capability permits up to four levels of display list

nesting. Vector and end-point intensity may be set to any of four levels under software control.

With a worst-case graphics memory loading of less than 43%, the graphics processor leaves memory cycle time for significant computation, data acquisition and transfer, the firm said.

Software provided with the system includes a full set of Fortran and Basic applications routines which operate under Data General SOS or RDOS operating systems.

These software packages permit use of the system as an intelligent graphics terminal when attached to a host computer or as a complete computer-based graphics system with full SOS or RDOS software capability when used in a stand-alone configuration.

The complete Megraphic 6000 starts at \$16,800. The firm is at 1055 Shafter St., 92106.

## Miniworld Products

### Broomall Adds Flatbed Plotter

BROOMALL, Pa. — The 430/201 Flatbed Dataplotter from Broomall Industries, Inc. is designed for high-speed plotting of digital graphic information requiring smooth line quality.

Lines drawn at any angle as well as curved lines do not exhibit step functions because plotting is performed in the line segment mode rather than incremental mode, the firm said.

A digital servo (closed loop) positive position system controls the pen so the system is drift-free, and a special velocity control which is included as part of the control system optimizes the speed of plotting, the firm added.

The standard plotting area of the 430/201 is 54 in. by 76 in. on a variety of

drafting quality papers, mylar and scribe coat.

Among the standard features of the 430/201 are 0.001-in. resolution, a special control unit for easy interfacing to an on-line computer and manual interrupt.

Optional accessories include multipen assembly, a precision paper advance system, a scribe tool attachment and a symbol printer.

The 430/201 is priced at \$37,000 including controller and board. The firm is at 682 Parkway, 19008.

### IDI Disk Controller Fits Varian Machines

ELMSFORD, N.Y. — Large-capacity disk memories, models 114, 213, 214 and 215 from California Computer Products (Calcomp), can be added to any Varian Data Machine 620 or V70 series minicomputers using the Disk Controller Type 70-5032 introduced by Information Displays, Inc. (IDI).

Compatible with both Varian and IDI software, the controller can operate from the PMA, DMA or HDMA channels. Previously available disk controllers for these large-capacity disk memories required the Varian computer to have a PMA channel, the firm said.

Because the older Varian 620L, 620L-100 and 620I or the recently introduced V71 minicomputers do not have PMA channels, the large disk memories could not be used with these models.

The controller includes its own cycle-steal hardware and fits into the standard Varian I/O slots.

The controller is priced at \$5,500 from the firm at 150 Clearbrook Road, 10523.

### BP-753 Unit Converts Data for CA Series

SAN DIEGO, Calif. — An 8-channel digital-to-analog converter card from Megatek Corp. occupies one half-slot in the Computer Automation Alpha-16, Naked Mini or LSI series minicomputer.

Jumpers are provided to set the BP-753's device code and to individually select unipolar or bipolar output, with straight binary or two's complement coding.

Single quantity pricing for the BP-753 starts at \$1,195. Megatek is at 1055 Shafter St., 92106.

### Talos Digitizer Handles

#### 44-In. by 60-In. Documents

SCOTTSDALE, Ariz. — Talos Systems, Inc. has an all-electric digitizer with a 44-in. by 60-in. active area for computer-aided drafting, cartography or other applications requiring large documents.

The digitizer features Talos' proprietary closed-loop, all-electronic writing servo, a low profile and a Formica surface.

The system is not affected by the environment, noise or stray magnetic fields; units are permanently calibrated and never need realignment, the firm added.

Standard resolution is 100 line/in. with stability and accuracy of  $\pm .01$ . Two hundred line/in. resolution is now available on the firm's 11-in. by 11-in. and 14-in. by 14-in. models.

On-line and off-line interfaces, OEM packaging and systems are available. The user can choose between a sharply pointed pen stylus, a ball-point pen and a ball-point stylus without ink. The firm is at 7311 E. Evans Road, 85260.

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# Mini Gives Health Group Five Bonus Work Days a Month

LONG BEACH, Calif. — Keeping health costs down while improving the quality of patient care is no easy task.

At Family Health Program, Inc., a minicomputer has proven so valuable that bookkeeping efficiency has improved by five working days a month, doctor productivity has increased and patient paperwork has been

greatly expedited.

"All of these achievements have resulted in a tremendous cost savings," Dr. Robert Gumbiner, president of the health maintenance group, said.

Gumbiner founded the firm 12 years ago and the operation has grown so fast it has tripled in size over the past five years to 60,000 members in seven clinics

throughout southern California and Guam. It has nearly 400 employees, including 60 doctors, and generates \$14 million annually.

"About five years ago we planned to have a computer system built from scratch to our specifications, including hardware and software," Gumbiner said. "This eventually proved not to

be feasible, so we brought in a consultant to research the market.

"According to his investigation, a Basic/Four minicomputer was suited for our requirements, particularly because we wanted to eliminate keypunching and this system uses a CRT keystation.

"In addition, the consultant recommended Opscan as the optical character recognition unit because of its compatibility with the Basic/Four minicomputer."

Before the installation of the system two years ago, the bookkeeping was done manually. As a result, each patient's contract, charge slips, etc., were posted five to 10 days later.

Now, with the computerized method, it takes one day to check the codes on the forms to verify membership, run the data through the computer and get the information back to the accounting department.

The computer is used to maintain a master file on each of the 60,000 members, plus all of the accounting functions.

Each patient is issued a plastic identification card with a ma-

chine-readable coded imprint. The member presents the card to the receptionist, who inserts it in an on-line device that sends the characters over telephone lines to the computer to verify the member's eligibility.

When the physician sees the patient, all the doctor is required to do is check off the appropriate boxes, such as type of illness, on machine-readable forms. These are then used on-line with the mini and sent to the accounting department for money verification.

From there, the forms are sent to the DP department and processed through the Opscan so the doctor's examination data can be fed into the computer.

But the system can handle a lot more than just the accounting applications, Gumbiner pointed out.

In addition to the on-line credit verification already mentioned, it stores the information on disk to use later for statistical reports, such as determining patient loads or assessing whether a doctor is measuring up to the expected performance level.

## CDC Offers New Life for System 17

(Continued from Page 27)

Applications for CDC's 1500 series analog and digital equipment now can install these devices at locations remote from the controlling System 17 using the CDC 1590-3 remote computer interface subsystem priced at \$6,500.

The subsystem consists of a local control unit for the host computer and a remote I/O controller at the 1500 series' equipment site.

From 15 to more than 100 analog and digital devices can be interfaced to the remote controller for communication with the host System 17 at selectable data rates of 1,200- to 9,600 bit/sec, CDC said.

The company also introduced four Model 1566 digital-to-analog converters priced between \$1,063 and \$1,800. Each provides four data conversion channels and is contained on one or two printed circuit cards for

### User Discovers Mini Outclasses 370, 1130

(Continued from Page 27)

alarm monitoring system which will serve an initial 135 clients and will be computerized in the near future.

A new subsidiary, Management Control Systems Co., has also been formed to provide a total turnkey system and software support for those customers considering the installation of their own in-house DP systems.

low-cost, field-installable enhancement of applications in data acquisition and control.

#### System 17 Peripherals

A group of paper tape, punched card and magnetic tape peripherals as well as a seven-frequency real-time clock round out the additions to the System 17 family.

Replacing a capability previously available only through the software product set is the \$1,200 CDC 10336 real-time clock designed for on-line data acquisition applications.

The clock generates system interrupts after one of the seven available time intervals (1-, 10- or 100  $\mu$ sec; 1-, 10- or 100 msec; 1 sec) or measures elapsed time available to the computer program.

The CDC 1720-1 paper tape controller, priced at \$2,000, meets the requirement for paper tape I/O. It interfaces exclusively with Model 4020 paper tape readers and Model 4070 paper tape punches supplied by Facit-Addo.

Each single-board CDC controller handles one tape reader and a single punch.

An increase from 37.5- to 50 in./sec maximum tape speed, a controller housed in the main-frame cabinet and optional phase encoding are principal features of the CDC 1732-3/616 magnetic tape subsystem.

Tape transports used include the 616-72, a 7-track, 25 in./sec,

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Availability first quarter 1976 depending on negotiations. System runs under IBM maintenance.

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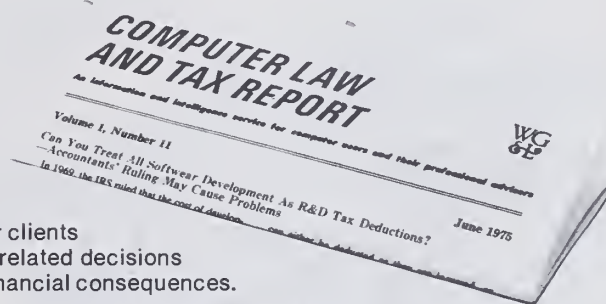
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CW



# Mini Eases Workload in Wisconsin Education Project

MADISON, Wis. — One of the most innovative ideas to come along in the past century is a system of individually guided education (IGE) where each pupil is allowed to progress at his own rate of learning.

The concept was originated and has been fostered for the past decade at the University of Wisconsin's Research and Development Center for Cognitive Learning. Here a minicomputer with 192K bytes of main memory is part of a system designed principally to take some of the

day-to-day workload off teachers in the IGE research project.

IGE accounts for what the student already knows, how fast he learns and his own characteristic learning pattern.

It relies on an organization known as the "multiunit" elementary school, where there is no segregation by age or grade. In this arrangement, student ages may span as much as three years in one instructional unit.

An average school might consist of four units, each with 100 to 150 children, a unit leader

and three or four staff teachers.

Instruction is most often carried out with small groups who have similar needs, although one-to-one, large-group or independent activities make up much of the IGE technique.

This type of organization for individual instruction is considered to be the first real alternative in the past century to the age-graded (first grade, second grade, etc.), self-contained classroom system. And it is made more viable because of the tremendous detail-resolving ca-

capacity of the computer, according to Dr. Sidney L. Belt, coordinator of computer-managed instruction.

Computerized systems permit better decision making than would be possible without a computer and provide an effective means of monitoring student progress on a continuous basis, Belt said. Computerized systems also give the teacher more time with students by eliminating most clerical tasks.

The Harris mini and its peripheral equipment in use at the

R&D center provide capability in six areas: access to much larger computing systems at the university; storage retrieval and reformatting of large experimental data sets for later transmission to the larger computer; storage, retrieval and interactive analysis of small data sets; the conduct of psychological and learning experiments; business applications; and the support of the development of a computer network in schools in order to manage IGE.

Aided by on-line interactive terminals now being installed in 13 schools, the computer will be effective in resolving two major types of decisions — the establishment of educational objectives for the district, school, unit and individual student and the selection of teaching methods to meet each student's needs.

To provide help in both these areas, the computer focuses on five major processes: test scoring, achievement profiling, diagnosing, prescribing and instructing.

Test scoring is an updating process, while achievement profiling makes use of the data base to produce a report for students, teachers and parents.

Diagnosing involves comparison of achievement information with expectations.

Prescribing utilizes diagnostic reports to select methods and types of educational experiences appropriate for each student's needs. Instructing is the orderly implementation of the prescribed plan.

The Harris Slash 5 CPU has 192K bytes of memory with two ASR Teletypes, an acoustic modem interface, an asynchronous 16-channel multiplexer, two synchronous interfaces (remote job entry to Univac 1110), 7- and 9-track tape recorders from Pertec, Documentation 600 card/min reader, a Control Data Corp. 600 line/min printer, two ISS 28M-byte disks, an 80M-byte CDC disk and six asynchronous line interfaces which support 16 terminal ports.

## System Speeds Consumer Data

CUPERTINO, Calif. — National Purchase Diary Panel, Inc. (NPD), a consumer research firm, recently decided to acquire a minicomputer system to increase efficiency.

The company runs various panels of consumers who record their purchases and report other information that influences buying. The information guides consumer product companies in developing and marketing products.

A Hewlett-Packard HP 3000 was selected because NPD was reluctant to invest the time and money and add the necessary staff to support a large-scale computer at this time, according to Michael A. Sauter, manager of DP operations for client service.

NPD's system includes 96K bytes of memory, a 200 line/min line printer, 800 bit/in. magnetic tape drive, 600 card/min reader, 10M bytes of disk storage, 16-port terminal controller and two HP 2640A CRT terminals.

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## Mini Keeps Track of 30 Types of Mink

NEW YORK — Now the mini-computer is doing what only minks could do in the past — tell one apart from another.

Actually, keeping track of 30 types of mink coats is part of a tight inventory control system

that means thousands of dollars to a luxury fur retailer — Revillon, Inc.

There are 22 Revillon salons and boutiques in Saks Fifth Avenue stores throughout the U.S. with additional branches world-

wide.

Prior to installing a Basic/Four minicomputer, the American chain used to keep an index card on each fur item in stock.

This has been eliminated by maintaining detailed inventory control records on all the luxury furs we handle," Sylvain Klein, the firm's treasurer/controller said.

"Our chain here in the U.S. carries about 600 different types of coats; in mink alone we have nearly 30 distinct styles. Needless to say, if we lose track of a sable coat, it's quite different from missing a pair of gloves," said Klein.

In addition to inventory control, Revillon is using the mini for sales records and to handle the payroll for 175 employees.

## Bus Converter Plugs Into Eclipse

FT. LAUDERDALE, Fla. — The RTP7410/60 bus converter from Computer Products is contained on a single printed-circuit board that plugs directly into any unused I/O slot in the Data General Eclipse minicomputer.

This I/O bus converter allows Computer Products' real-time peripheral (RTP) family of analog and digital I/O measurement and control equipment to be operated under the control of the Eclipse using the mini's standard

I/O instructions; the converter provides the mini with the capability of communicating directly with any RTP controller.

Up to eight RTP controllers can be connected to one converter in chain fashion using Computer Products' RTP I/O cables.

Price of the RTP7410/60, including one RTP I/O bus termination card, is \$450. The firm can be reached through P.O. Box 23849, 33307.

## CAI to Help Students Catch Up

SALEM, Ore. — Educationally delayed, teenaged American Indian students from four states are being given a chance to further their education with the help of a minicomputer.

Chemawa Indian School here has purchased computer time with the Oregon Total Information System (Otis) in Eugene. The school, founded in 1883, is the oldest continuously operated Indian boarding school in America, providing dormitory living during the school year to high-school-aged children from tribes in Alaska, Oregon, Washington and Idaho.

The computer time will provide each student who is more than three years below his grade level with a system focused around terminals and computer-aided instruction (CAI).

The minicomputer directing this instruction will be a Hewlett-Packard Model 2000F, the third in Otis' inventory.

According to Dr. Y.T. Witherspoon, special projects coordinator for the school, 16 terminals will be divided among three separate labs for reading, language and math.

"Students will use the lab that answers their own particular need. We will be able to give each youngster 10 minutes per day on a terminal.

"It is our hope," continued Witherspoon, "that, by using the computer-aided instruction, we will be able to compress at least seven years of education into the usual four.

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## Groups Seek Papers On Writing Programs For Minis, Micros

NAPERVILLE, Ill. — The Association for Computing Machinery (ACM) Special Interest Groups on Minicomputers (Sig-mini) and Programming Languages (Sig-plan) are soliciting papers for an interface meeting on "Programming Systems in the Small Processor Environment" to be held at the Delta Towers Hotel in New Orleans on March 4-6.

Co-Chairmen are Ted G. Lewis of the University of Southwestern Louisiana and Lawrence J. Schutte of Bell Telephone Laboratories.

Original papers are invited from both academia and industry on the special advantages, problems and techniques of programming small processors.

Related areas of interest include programming support software (whether executed on small or large computers), software structures and programming management, provided that topics are influenced by a small processor environment.

Authors should submit five copies of the manuscript with abstract by Nov. 10 to Lawrence J. Schutte, Room 6B-302, Bell Telephone Laboratories, 60540.

Notifications of acceptance will be prior to Dec. 10. Final papers will be due by Jan. 15.

## EH Research Offers Data Collection Unit

OAKLAND, Calif. — The Dataquire 7000 from EH Research Laboratories, Inc. is a microprogrammed data logger/acquisition system designed for general-purpose data collection.

The unit comes equipped with 10 input channels and can be expanded to 1,000. A 9-digit real-time clock with independent display and a multirange timer with a range from 1 sec to 99 hours are included with the system.

Independent channel monitoring and random channel skipping features are standard and accessed at the front panel.

The system can measure from 1 microvolt to  $\pm 20$  Vdc, as well as inputs from all popular thermocouples, strain gauges, photo multipliers and most analytical instruments, the firm added. Digital input from contact closures, BCD counters or other instruments is also accepted.

Output to any recording device (Teletype, 9-track magnetic tape, paper tape punch, etc.) or external processor (minicomputer, programmable calculator, large CPU) directly or through phone lines or a terminal is possible.

Prices for a complete unit start at \$5,200. The firm can be reached through P.O. Box 1289, 94604.



## CI Notes

### Through Acquisition

## DP Service Firms Enhance Capabilities

### Judge Denies IBM Motions

NEW YORK — Federal Judge David N. Edelstein denied two motions made by IBM last May to dismiss the antitrust charges which the Justice Department has brought the corporation to trial [CW, June 11].

Made verbally in court following opening statements by both sides, the IBM motions were deemed "inappropriate" by Edelstein at that time.

IBM claimed the government's opening statements failed to show it will try to prove the corporation acted illegally to gain and maintain monopoly power.

IBM also argued the government has conceded that bundling, in particular, is a practice that does not violate the law.

Edelstein, however, ruled against IBM's motions because the Justice Department has repeatedly stated its intention to prove that, while IBM actions, including bundling, are legal in themselves, they are also part of an overall scheme to limit competition.

### MPI Begins Operations

MINNEAPOLIS — Magnetic Peripherals, Inc. (MPI), the joint venture of Control Data Corp. and Honeywell, Inc., has begun operations.

MPI is 70% owned by CDC and 30% by Honeywell, and CDC is responsible for management, CDC said.

CDC's plant in Palmela, Portugal and one plant of Compagnie Honeywell Bull may be transferred to the new company, CDC said.

Management remains unchanged in the seven manufacturing facilities which include CDC plants in Minneapolis; Redwood Falls, Minn.; Rapid City, S.D., and Hawthorne, Calif., as well as three Honeywell plants in Oklahoma City.

MPI designs, develops and manufactures rotating mass memories which will be sold by CDC and Honeywell.

### About 65% of NCC Space Sold

NEW YORK — About 65% of exhibit space at the 1976 National Computer Conference (NCC) in the New York Coliseum has been booked, according to the American Federation of Information Processing Societies (Afips).

Reservations have been received from 119 companies booking more than 625 booths, Afips said. Over 275 companies are expected to participate in the exhibit June 7-10.

### Super Disk in Test Mode

Storage Technology Corp. has its Super Disk installed at four sites undergoing acceptance test and evaluation.

By Nancy French  
Of the CW Staff

Several major DP service companies have chosen the acquisition route to gain control of both batch-processing and interactive time-sharing service capabilities, in what has been called "a healthy consolidation trend."

Automatic Data Processing, Inc. (ADP), based in Clifton, N.J., recently acquired The Cyphernetics Corp. of Ann Arbor, Mich., a firm offering interactive time-sharing services with a packet-switching network.

The move was aimed at upgrading its stand-alone local batch-processing service centers, ADP Vice-President Don Shaw said.

Tymshare, Inc., a Cupertino, Calif.-based firm offering interactive time-sharing services, acquired Major Computer Corp. of Jericho, N.Y., to enhance the batch-processed fuel oil distribution serv-

ices industry it entered last December with the purchase of United Data Centers, according to Tymshare President Tom O'Rourke.

Itel Corp., whose DP group is headquartered in White Plains, N.Y., acquired Cleveland-based Central Data Systems, Inc. to give itself an entry into the Midwest. Itel offers industry-specialized time-sharing services while Central has batch centers in Cleveland and Pittsburgh, Pa., according to DP Group President William H. Bird.

### Lack of Capital Cited

The growing number of consolidations has been attributed not to another shake-out, but rather to a lack of capital for expansion.

There are more successful small service companies out there than there were four years ago because, to survive, they have had to be profitable. There is no capital

available for deficit-type companies today, the three executives agreed.

There is little capital available for expansion either, Bird said. "Right now, regional businesses in places such as Cleveland, Pittsburgh and Chicago need capital to expand. Not only that, these firms need the kind of marketing capabilities companies such as ours and ADP and Tymshare have.

### Most Profitable Route

ADP's Shaw said, "eventually, I see all the major service companies offering a wide range of products, some free-standing and some integrated on a communications basis.

"We're all going to be there one way or another. It's only a question of what is the fastest, most convenient and most profitable route."

The route ADP chose was to specialize in the low end of the market, grow very large in that strata and then add sophistication, according to Shaw.

"Others started in the high end and now are slowly working down," he said.

"We've even seen competitors, who in the past turned up their noses at packaged accounting opportunities in favor of high-flown aerospace technology, casting avaricious eyes at the \$100-a-week payroll account today," he said.

### Tymshare Acquisitions

Tymshare's recent acquisition of Major is the fifth acquisition Tymshare has made in the last four or five years, O'Rourke said.

Prior to adding Major and United, Tymshare bought Computer Complex, based in Houston as well as Graphic Controls, based in Buffalo, N.Y.

"Graphic Controls had Digital Equipment Corp. Decsystem-10 equipment and we needed that technology," O'Rourke explained.

Tymshare also acquired Valcomp in Los Angeles, which maintains Xerox computers. "We had just acquired Xerox machines and we wanted parts and maintenance capability," he explained.

"We're looking for companies that have very strong capabilities in market segments that look interesting and we think have a lot of viability," he explained.

As an example, "United Data Centers had a major product line in fuel oil distribution. The acquisition of Major will enhance that particular product line and also provide us more coverage.

### 'Plain Vanilla'

In contrast to Tymshare, the vast majority of ADP's business is "plain vanilla batch-processing," with 34 stand-alone centers in the U.S., according to Shaw.

(Continued on Page 34)

## Philips Still Most Popular Medium

WELLESLEY, Mass. — While the floppy disk has stolen the data-recording limelight during the past year, a recent survey showed the Philips cassette is still the most popular low-cost magnetic data-recording medium.

There are two reasons, price of the cassette drive to the systems manufacturer and timing — the Philips cassette was the first one available — according to a report published by Venture Development Corp.

Burroughs Corp., NCR, Sycor, Inc. and Datapoint, for example, made early decisions to adapt the Philips cassette drive for use in their intelligent terminals and small business systems, and today such systems account for 60% of the cassette drive market, the report said.

The general-purpose minicomputer user accepted the technology readily in recording data for store-and-forward applications, program loading and off-line storage, for example.

By the time the 3M Co. cartridge was developed as a higher performance digital recording medium, the major manufacturers had all opted for the Philips cassette.

The 3M cartridge has, nevertheless, achieved popularity among users of special-purpose data-recording equipment such as diagnostic systems for medical applications, the report said.

Producers of Philips cassette drives are selling them on the open market, and 10 more make drives for use in their own systems. Less than half as many companies produce 3M drives, the report said.

Cassette drive usage is increasing in absolute numbers, but floppies are gaining a

larger share of the market for data recording in general-purpose minicomputer applications, intelligent terminals and small business systems wherever fast access is important, the report said.

However, floppy disk drives are fundamentally more expensive than cassette drives because of more complex hardware and software.

(Continued on Page 34)

## MSI to Discontinue Astros POS System

COSTA MESA, Calif. — The arena of point-of-sale (POS) systems for supermarkets has one less gladiator, as MSI Data Corp. has stepped inside.

Citing the "extreme slowness" of sales, the firm said it will stop supplying its Astros POS system, but will continue to make other field data entry systems.

MSI will try to sell or license the Astros system, said President William J. Bowers, who estimated pretax reserves of \$2 million to \$2.5 million are needed to cover the withdrawal.

MSI plans to fill all orders due for delivery before Dec. 31 and will continue field maintenance of installed systems for the next five years.

In 1975, Astros sales totaled \$920,000 and systems have been delivered to 23 supermarkets.

The firm said direct costs and expenses in excess of revenues for Astros totaled \$1.4 million during fiscal 1975 and \$285,000 during the first quarter this year.

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# CDC Begins Shipments of Cyber 170

MISSISSAUGA, Canada — Control Data Canada Ltd. has begun shipments of its Cyber 170 system, which "could total \$150 million over the next five years," said John V. Tittsworth, executive vice-president of systems.

"CDC is relying heavily on our research, development and manufacturing center here to accomplish this ambitious but realistic goal," he added.

The first Cyber 170 shipped to a customer was a Model 172 destined for the National Institute of Agrarian Research in

Madrid, Spain, where it will be used for agricultural research and documentation.

CDC is anxious to further its five-year-old cooperative agreement with the Government of Canada by pursuing new developments in computer products and applications of particular value to the Canadian market when and if the government is willing, Tittsworth said.

Vernon E. Sieling, senior vice-president of marketing operations, said the 170 program was meeting its four primary corporate objectives:

- Maintaining the company's existing computer systems customer base.

- Expanding the customer base (approximately 50% of the orders received from around the world to date for Cyber 172s and 1973s are from new accounts).

- Providing a vehicle for CDC to offer integrated computer systems and services.

- Improving corporate revenue and profitability in the systems product line.

The Cyber 170 family, consisting of the Models 172, 173, 174 and U.S.-designed and built 175, is the first family of CDC systems designed to meet the needs of complex computer networks as well as stand-alone applications, the company said.

The first Cyber 175 is scheduled to be shipped from the Arden Hills, Minn., plant in late September. The systems replace the Cyber 70 series produced since 1971.

## CA Expands

IRVINE, Calif. — Computer Automation, Inc. (CA) is expanding into the end-user market for computer systems with the acquisition of a systems software package and the formation of a new division, Commercial Systems.

President D.H. Methvin said the company has acquired exclusive rights to a software package for small business systems from foreign interests.

The development of the new system is a logical adjunct to the company's principal business of manufacturing minicomputers for the OEM market, which the company will continue to emphasize, he said.

The software is designed to take advantage of CA's Mega-Byter and the software/hardware combination will eventually comprise a system featuring virtual memory storage, interactive communication from remote terminals and broad data base management.

# Philips Still Top Low-Cost Medium

(Continued from Page 33)

The report predicted that, by the end of 1975, 172,000 cassette drives will have been shipped, for a value of \$97 million worldwide. By comparison, only 10,500 cartridge drives will have been shipped, bringing in \$8 million, the report said.

Floppy disk drives will bring in \$25 million this year, the report said, with 52,000 units shipped.

By 1980, cassette drive shipments will have expanded to 366,000 units, cartridge drive shipments to 52,500, and floppy disk drives to 276,000.

## Flux Ended

The period of rapid flux that characterized the cassette drive market for some time has settled because cassette drive users are generally satisfied and are not looking for a "better mousetrap," the report indicated.

Once designed in, the mechanical and electrical complexity of the interface tends to prevent the user from changing to another drive in future product revisions, the report said.

Cassette usage will begin to level off in 1977 at a rate of 17,000 units per year, the report said.

Sales of 3M cartridge drives will total \$8 million in 1975, only 1/13 the size of the cassette market. Six competitors share the market.

The cassette media market is booming, with sales volume expected to reach \$16.7 million in 1975.

Although the cassette tape growth rate will slow to about 18% a year in 1980, the volume of sales that year is expected to reach \$54 million, the report said.

3M is the leading supplier of tape used in digital cassettes, while Information

## Service Firms Choose Acquisition Route

(Continued from Page 33)

"Through the medium of Cyphernetics, we can now interlink these data centers and also extend our product line in two ways," Shaw explained.

"First, we will be able to concentrate production of specialty products in a single location, namely Cyphernetics headquarters, and then pick up input and distribute output anywhere in the country or the world where there's a telephone," he said.

"Secondly, we can begin to use the network to extend out from these individual free-standing offices into secondary markets in a satellite fashion."

Itel's acquisition of Central Data "allows us entry into a market with an existing client base that is easier to expand than going into a city without a presence."

All three acquiring firms reported strong business volume this year.

Tymshare reported revenues up 25% over last year, with earnings 50% ahead, while ADP said earnings are better than 19% ahead of last year. Itel reported new sales up 50%, but noted some existing accounts, where the firm charges by the transaction, were down.

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## Not a Key-to-Disk System

# Sycor 440 Aimed at Distributed-Processing Market

By Molly Upton  
Of the CW Staff

ANN ARBOR, Mich. — Sycor, Inc.'s 440 system is aimed at the distributed-processing market rather than the key-to-disk market, explained Paul C. LaVoie, vice-president of marketing.

With its ability to perform data entry concurrently with processing and its shared files for inquiry/response systems [CW, Aug. 6], the system is "an extension of the intelligent-terminal concept," he said.

The 440, which comes with dumb terminals in a cluster, is software-compatible and can communicate with 340s and 350s.

LaVoie sees the competition as Datapoint Corp.'s 5500 and Four-Phase Systems, Inc.'s 470, he said, although in the

future he expects more key-to-disk firms as well as minicomputer companies to move into the area.

However, he noted, the key-to-disk firms will have to improve their user-programmable language to handle more editing functions. The mini makers would need more, numerous maintenance facilities because of wider geographical distribution, he said.

Currently, LaVoie said, Datapoint and Sycor are the only firms that offer a user-programmable system in both network and cluster configurations.

A number of the incoming orders for the 440 should be for use with mixed networks, he said, either with 350s, which use a floppy disk, from new customers or with installed 340s from existing customers, he said.

He does not expect the 440 to cause a significant number of 340s to be returned, explaining he expects users will find new applications for them in different areas.

### On-Line Applications

Although forecasts indicated on-line capabilities are the wave of the present, on-line applications are not taking hold as rapidly as might be thought, said LaVoie.

Currently, about 30% of Sycor intelligent terminal shipments are on-line units, whereas the remainder are batch-oriented, he noted.

"Even though users say they are going on-line with an IBM 3704 or 3705, they're still using magnetic tape," he said.

About 75% of Sycor's installed base does not transmit with a mainframe di-

rectly, he noted. Units generally create a computer-compatible magnetic tape — mostly 800 bit/in., he said.

Thus, even in the worst instance of an attempted lockout by IBM with a Systems Network Architecture scheme, LaVoie doesn't expect Sycor to be seriously impacted.

For instance, even if IBM were to transmit a microcode that would prevent independent terminals from linking with its mainframes, most of Sycor's users don't link with mainframes, he said.

However, LaVoie added he thought users and the Justice Department would ally to prevent IBM from implementing such a scheme.

### Rental Base

Sycor's rental base, with revenues rising from rental, and service rising to \$14 million during 1974 compared with \$7.2 million in 1973, aids in buffering the effects of the recession, he said.

Although the manufacturing sector was somewhat less receptive to installing equipment this year, Sycor beefed up installations in banks and insurance industry instead, he said.

About 80% to 85% of Sycor's domestic revenues are from rentals, he said. The firm established Sycor Leasing to handle most of its lease base, with leases recorded on the operating method.

During 1974, about half of the firm's revenues came from business abroad, handled through Olivetti and a subsidiary of Mitsui & Co., Ltd. These transactions are on the books as sales, he noted.

About half the leases are for two years or longer; they used to be principally one-year leases, he said.

Sycor has been moving toward vertical integration, he said, with the adage that, if it's sold in volume, the firm should build it itself.

Sycor makes a matrix printer, using rights from Logabax, S.A.; its own floppy disk drives; and cassette recorders. It buys line printers.

### Software Key to Viability

Software is becoming increasingly important as a key in market viability, he noted, since it is relatively easy to assemble a processor on a chip, a CRT and a floppy and call the unit a system.

But software is what makes the difference, he said, along with marketing and field engineering.

Sycor is boosting the ratio of field engineers to salesmen from 4 to 1 to 2 to 1 to handle both increasingly complex systems and the expanded base, he said.

Sycor salespersons exemplify the systems approach to problems, since most of them were formerly systems engineers and then in sales for mainframe firms.

LaVoie noted the yearly quota for Sycor salespeople is larger than that for the average salesperson for a mainframer. A Sycor salesperson's quota is over \$1.25 million compared with a mainframer's quota of \$750,000, he said.

### Intelligent Terminal Area

Sycor's growth in the intelligent terminal area evolved when users wanted something more intelligent than a teletypewriter and less complicated than a card punch, LaVoie said.

At first, Sycor's unit performed only the editing functions of a keypunch unit, he said, but users wanted more capability.

Initially, it was difficult to sell systems to headquarters of a large firm. The subsidiaries of large companies were begging for additional capability, as they were unable to get what they wanted from central DP.

Central DP saw that more remote intelligence would relieve some of its preprocessing load, and Sycor installations began to grow in number, LaVoie said.

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**Says Leasing Firm Head****User Commitment Finalco Byword**

BOSTON — Commitment to users is a byword of Finalco, Inc.'s philosophy, said President Michael V. Jennings in an interview here.

Finalco, which specializes in leveraged leases, has a \$194 million portfolio ranging from Basic Four Systems to IBM 370s, he said.

Although Finalco has been expanding its customer base by word of mouth since its founding in 1968, the firm is now ready to cast off its image of the unknown lessor and further expand.

Finalco feels it has gained momentum and knows it can find the financing and raise the equity necessary to expand its business, said Lee B. Burnett, executive director of marketing. Finalco requires that a customer be a single A bond-rated company, he added.

Because Finalco is user-oriented instead

of portfolio-oriented, users can upgrade at will, and Finalco will help them plan to satisfy their present and future DP requirements, Jennings said.

Finalco, based in Vienna, Va., will provide documentation, assistance with vendor negotiations and legal and tax accounting advice, he said.

As one example of the service Finalco offers, Jennings said the recent Honeywell announcement that its software was not transferable from user to user did not affect Finalco's Honeywell base since it specified in all its contracts with Honeywell that the software would be transferable.

Flexibility is one key to Finalco's method of operation, Jennings said, noting users can upgrade or exchange their equipment, rather than being locked into a lease for a specified time.

**Asset Management**

The term "asset management," in the case of Finalco, seems to apply both to the financial institution that underwrites the equipment and to the user.

For instance, the user's bookkeeping chores, including transportation, swapping and upgrading machines, are reflected in a monthly bill from Finalco.

Although a user might have equipment on a short-term lease, he can pay as though it were on a long-term lease, Jennings said.

The financial institutions, which are technically the owners of the equipment, invest not only in the present equipment but in the knowledge that it will probably be upgraded within four years, as is the industry average, he said.

The user gets the investment tax credit, he added.

Founded by ex-Honeywell personnel, the firm initially dealt in Honeywell equipment. Currently it handles about 3.5% of Honeywell's customer base, Jennings said.

At the end of 1973, the firm decided to branch out and go into the IBM equipment market and has about \$25 million in IBM gear, he said.

**Western Peripherals Enters Mini Market**

ANAHEIM, Calif. — Western Peripherals Corp. has been formed to manufacture and market minicomputer tape and disk interface systems.

President Randy Knapp said the firm's goal is to operate as an independent minicomputer peripherals company supplying both the end user and OEM markets.

The company's first order, a contract for magnetic tape interfaces for use with Data General Corp. Nova computers, is scheduled for delivery Aug. 15.

Western Peripherals plans to introduce tape and disk system interfaces, each mounted on a single board for embedded use in Data General Nova and Eclipse series computers and in Digital Equipment Corp. PDP-11 and PDP-8 computers.

The tape interfaces are phase-encoded and NRZ-compatible on the same board, and will interface to the industry standard tape drives such as those from Per-tec, Wangco, Cipher, Kennedy and Bright.

The disk system interface will be compatible with the industry standard Per-tec Corp.-type 3341 disk as well as the Control Data Corp. larger capacity devices.

Field service will be performed by a third-party. In-plant support of the equipment will be performed by a national service organization, and a sales force is being established through representatives.

Western Peripherals is at 2893 E. La Palma Ave., 92806.

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# Qume to Charge Xerox With Restraint of Trade

HAYWARD, Calif. — Qume Corp., a manufacturer of character printers for word processing and computer systems will file an antitrust suit against Xerox Corp. shortly, according to Qume President Robert E. Schroeder.

The suit will allege that Xerox has used a variety of anti-competitive actions to control the OEM character-printer market and the independent portion of the multimillion dollar word-processing market.

The Qume decision came in response to a suit filed by Xerox in the U.S. District Court in San Francisco on July 24 alleging that Qume infringed patents and misused trade secrets relating to character printers made by its subsidiary, Diablo.

## 'Complete Surprise'

Schroeder said the Xerox filing came as "a complete surprise" since, at the latest of a series of meetings between Xerox and Qume held to discuss patents and trade secrets, Xerox had agreed to provide details on certain of its general claims. It filed the suit instead, Schroeder said.

Meetings between the two firms began six months ago when Xerox representatives, asserting patents were being infringed, requested that Qume enter a licensing agreement with Xerox for the manufacture of Qume printers.

Qume refused, based on advice from a patent counsel who also disagreed with Xerox claims.

Qume also investigated the trade secrets claims and found them to be "more than two years old and completely without merit," Schroeder said. "We offered to turn over the patent claims to an independent patent counsel for arbitration and to abide by his decision," Schroeder noted, "but Xerox refused."

Qume began operations two years ago with the development of a printer design. A year later, it began to manufacture a family of character printers it claims is not only different from Diablo printers in all key design areas but also "clearly superior in overall performance, structural integrity and reliability," Schroeder said.

## Acquisitions

Advanced Computer Techniques Corp. (ACT) has acquired Base, Inc. as a wholly owned subsidiary. Under terms of the agreement, ACT will provide certain financing and technical support to Base's product line. After four years, a final price will be determined. Base manufactures information- and word-processing systems.

Pitney Bowes has acquired the Micro-Well process of Mohawk Data Sciences, Inc., which is used in the manufacture of ink rollers and pads. The process will

be used by Monarch Marking Systems, a Pitney Bowes subsidiary.

Control Data Corp. has acquired the remaining shares of Compu-Net, Inc. from a group of private investors. CDC has held a minority interest in Compu-Net since 1971.

Adia Services, Inc., a European-based temporary-help company, has acquired the Task Force Division of Statistical Tabulating Corp. for an undisclosed amount of cash.

Greyhound Computer Corp. has acquired General Systems Corp., and, under terms of the agreement, has assumed full operations.

Data Card Corp. has acquired the assets of Troy Computer Products Corp. from Cordura Corp. for \$1.65 million in cash plus assumption of certain liabilities of Troy.

United Telecommunications, Inc. has agreed in principal to acquire International Timesharing Corp.

Professional Data Processing Corp. has acquired Financial Information Services, Inc.

Manus Services Corp. has acquired the northwest regional commercial DP and temporary-help services of University Computing Co. (UCC). UCC's scientific and banking activities in the Northwest are not involved in the transaction.

Intel Corp. has agreed to acquire Central Data Systems, Inc. at a price of \$3.5 million.

Honeywell, Inc. has acquired the KMS Security Division of KMS Industries, Inc. The acquisition will permit Honeywell to provide direct computerized operation of security and fire alarm protection systems, Honeywell said.

## POSITION ANNOUNCEMENTS

### EXECUTIVE DIRECTOR MINNESOTA EDUCATIONAL COMPUTING CONSORTIUM

Statewide computer services consortium serving all levels of education in Minnesota seeks chief executive to guide and manage development of services. Major current activities include the implementation of a large statewide time sharing system to serve all levels of education and the development of a management information system to serve school districts throughout the state using a regional governance structure. Leadership and skill in working with diverse educational users are prime requirements. Experience in education, data processing and computing, and administration of complex projects highly desirable. Advanced degree desirable. Salary is negotiable commensurate with experience and qualifications. Applicants should submit resumes and references to James Pederson, Chairman, MECC, 208 State Administration Bldg., St. Paul, MN 55155. Date: Application Deadline — October 15, 1975. Desired Availability Date — On or before January 1, 1976. AN EQUAL OPPORTUNITY EMPLOYER

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## position announcements

### SYSTEMS ANALYST

Archer Daniels Midland Company, a leading processor of agricultural products for the food and beverage industries, has an immediate opening for a systems analyst in the corporate headquarters, Decatur, Illinois.

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## Executive Corner

Joe E. Wyatt has been appointed president of the Inter-university Communications Council, Inc. (Educom).

Brian M. Aspland has been appointed vice-president of sales of Interactive Data Corp.

F. William Stamper has been appointed vice-president of product planning and program development at Mohawk Data Sciences Corp.

Max Hugel has been named a vice-president of Centronics Data Computer Corp.

Norman A. Fletcher has been elected vice-president and a director of Computer Peripherals, Inc.

At Control Data Corp.'s Peripheral Products Division John E. Hillman has been named senior vice-president of operations and Gordon R. Brown senior vice-president of marketing and planning.

The following vice-presidents were named: Thomas E. Phillips, peripheral product sales; Elmer W. Kramer, manufacturing and quality assurance; and Leland F. Kremer, product management and planning.



## position announcements

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Requires strong sales ability; and experience selling computers, computer software or computer services would be ideal. A technical background and thorough understanding of some phase of data communications is necessary. Familiarity with banking and finance applications or exposure to diverse government agencies would be helpful.

### OEM MARKET:

Requires a technical background, particularly in electronics. Sales ability is a must, and experience selling a technical product to middle and upper management is preferred. Ideally, you will possess some knowledge of minicomputers and a good understanding of how small businesses operate.

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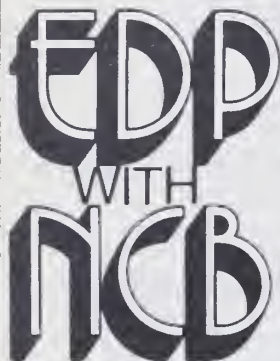
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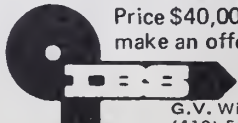
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# Two Mini Makers Report Income, Sales Up

Two minicomputer makers, Prime Computer, Inc. and Digital Computer Controls, Inc. (DCC) reported increased earnings and revenues for recent periods.

Prime's second-quarter sales rose 75% to \$2.7 million compared with \$1.5 million in the year-ago period.

Earnings totaled \$156,781 or 8 cents a share, including a \$73,435 tax credit, compared with a loss of \$164,389 or 8 cents a share in the year-ago period, when there was a \$3,849 tax credit.

During the 1975 period, tax credits totaled \$100,000 compared with \$34,685 in last year's

six months.

Second-quarter order rates were considerably stronger than those in the first quarter, the firm said.

President Kenneth Fisher said he is pleased with the significant increase in sales over the year-ago period and, more importantly, the continued increase in

profitability.

At DCC, first-quarter earnings rose 114% to \$89,462 or 6 cents a share compared with \$41,844 or 3 cents a share in the same period last year.

Revenues rose slightly to \$2.34 million compared with \$2.32 million a year ago.

President John N. Ackley remarked shipments have begun on the large order received from Nixdorf Computer AG, which "has been a welcome addition to the strongly growing international segment of our business."

## ...Toward the Bottom Line

Control Data has expanded its 1973 revolving credit agreement to a maximum of \$165 million at 1/2% over prime compared with the previous \$75 million limit. CDC terminated \$38 million of open lines of bank credit and pledged all capital stock of its Commercial Credit Co. subsidiary as security for borrowings under the agreement.

# Two Memory Firms' Results Weakened; Third Announces Increased Earnings

Two out of three memory makers reported weakened results recently.

Cambridge Memories, Inc. saw third-quarter and nine-month earnings decline, while Fabri-Tek, Inc. showed a loss for the year.

However, Advanced Memory Systems, Inc.'s second-quarter and six-month earnings increased.

Cambridge's third-quarter revenues were off to \$5.8 million compared with \$6.1 million in the same period last year, and earnings dropped to \$103,000 or 6 cents a share compared with \$321,000 or 19 cents a share in the same 1974 quarter.

For the nine months ended May 31, revenues rose slightly to \$16.7 million compared with \$16.6 million, while earnings declined to \$251,000 or 15 cents a share compared with \$748,000 or 52 cents a share in the same period last year.

At Fabri-Tek, the economy and the termination of its exclusive marketing arrangement with a third-party leasing firm for its end-user memories had a significant effect on both revenues and profits, said President L.D. Altman.

In addition, the firm wrote down about \$1.8 million in product and production equipment inventories, and its interest costs rose about \$600,000, he said.

For the year ended in March, Fabri-Tek lost \$1.7 million or 46

cents a share compared with earnings of \$1.8 million or 51 cents a share, including an \$860,000 tax credit.

Revenues totaled \$35.3 million compared with \$39.1 million in 1974.

At Advanced Memory Systems, although quarterly revenues declined to \$7.7 million compared with \$9.1 million, earnings rose to \$439,000 or 18 cents a share including a \$210,000 tax credit, compared with \$213,800 or 11 cents a share in the same 1974 period, when the tax credit was \$102,500.

During the six months, reve-

nues also were off, including a \$360,000 tax credit, rose to \$745,000 or 30 cents a share compared with \$244,800 or 13 cents a share in the year-ago period, when there was a \$117,500 tax credit.

President Orion L. Hoch commented, "Our sales have held above \$7.5 million for three successive quarters, despite the overall softness in the semiconductor industry and the economy, and earnings have improved in both quarters of 1975. We remain confident about the strength and potential of the computer memory business."

# MSI Revenues Up, Earnings Down As Company Leaves POS Market

COSTA MESA, Calif. — MSI Data Corp., which is checking out of the supermarket point-of-sale business, had first-quarter earnings that were approximately flat with operating results, but less than the year-ago earnings.

Revenues for the first quarter rose to \$8.5 million compared with \$7.5 million in the same period last year.

Earnings, however, were \$219,244 or 11 cents a share compared with \$318,686 or 16 cents a share in the year-ago period when there was a \$99,985 credit from an accounting change.

The results were improved over the preceding fourth quarter, when the firm earned \$34,784.

## Inflation Influence

Inflationary operating costs and recessionary economic pressures continued to influence earnings, the firm said.

Cost reduction and control activities implemented during the fourth quarter have produced "favorable results" in the first quarter, the firm said.

These included a reduction in bank loans of \$4.3 million since the end of fiscal 1975, with bank loans now at about \$6.2 million.

MSI has also reduced inventory, accounts receivable and operating costs.

## Sales Decline

The fourth-quarter 1975 sales decline, attributed to more conservative capital spending programs on the part of MSI customers, continued into the first quarter, with many customers ordering fewer products for delivery over shorter time periods, President William J. Bowers said. As a result, backlog dipped to \$9.6 million as of June 28, compared with \$14.8 million at the same time last year.

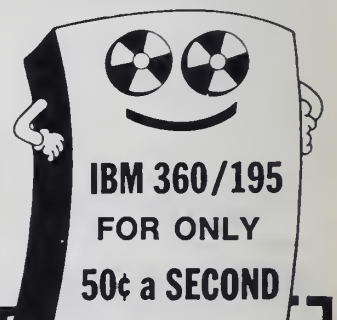
In 1976, Bowers said he expects to see little, if any, growth in both existing and new markets for the company's principal product lines.

"We anticipate the strength of our sales this year will generally follow trends of the national economy," Bowers said. "I believe the outlook for resuming growth in both sales and earnings is very positive for a number of reasons."

"First, MSI continues to be the leader in field data entry and, second, the market potential for field data entry products is enormous."

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Allen Parkinson, Chairman

## OPTICAL SCANNING CORPORATION

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## Earnings Reports

ITEL Three Months Ended June 30			VARIAN ASSOCIATES Three Months Ended June 27			WABASH MAGNETICS Three Months Ended June 30		
1975	1974		1975	1974		1975	1974	
Shr Ernd	\$ .25	\$ .32	Shr Ernd	\$ .31	\$ .30	Shr Ernd	\$ .15	\$ .22
Revenue	42,700,000	39,600,000	Revenue	79,782,000	76,038,000	Revenue	7,860,839	9,591,897
Spec Cred	.....	a100,000	Earnings	2,139,000	2,029,000	6 Mo Shr	.29	.50
Earnings	1,700,000	2,400,000	9 Mo Shr	.80	.78	Revenue	15,903,933	18,167,434
6 Mo Shr	.53	.59	Revenue	229,364,000	213,441,000	Disc Op	.....	145,000
Revenue	80,900,000	69,000,000	Earnings	5,518,000	5,251,000	Earnings	492,922	870,637
Spec Cred	.....	a300,000						
Earnings	3,800,000	4,500,000						

a-Tax benefits from discontinued operations.

a-Restated to reflect change to Lifo method of valuing U.S. inventories of instrument and equipment groups.

CINCINNATI MILACRON Three Months Ended June 14		
1975	1974	
Shr Ernd	\$ .62	\$ 1.13
Revenue	107,625,051	103,863,040
Earnings	2,297,483	a4,125,000
6 Mo Shr	1.27	1.75
Revenue	216,904,448	205,604,017
Earnings	4,704,033	a6,422,722

a-Includes gain of \$1.76 million from sale of assets of a division.

SYCOR Three Months Ended June 30		
1975	1974	
Shr Ernd	\$ .48	\$ .48
Revenue	13,116,100	9,785,400
Tax Cred	284,500	530,000
Earnings	1,356,700	1,344,800
6 Mo Shr	.92	.79
Revenue	24,312,000	19,128,500
Tax Cred	666,500	865,000
Earnings	2,573,400	2,197,800

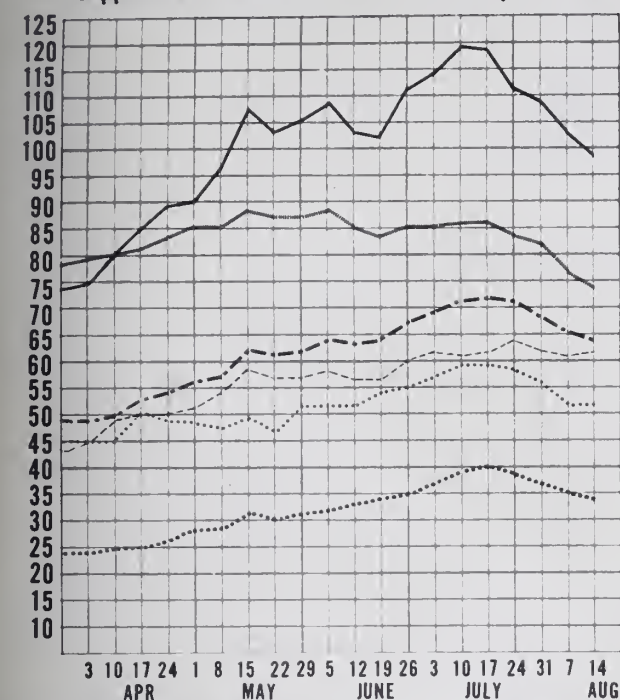
BURROUGHS Three Months Ended June 30		
1975	1974	
Shr Ernd	\$ .97	\$ .87
Revenue	416,890	379,039
Earnings	38,438	33,930
6 Mo Shr	1.62	1.42
Revenue	782,103	701,836
Earnings	64,066	55,306

CONRAC Three Months Ended June 30		
1975	1974	
Shr Ernd	\$ .65	\$ .60
Revenue	21,954,000	20,853,000
Earnings	873,000	790,000
6 Mo Shr	1.20	1.17
Revenue	42,963,000	41,143,000
Earnings	1,610,000	1,556,000

INFORMATION MAGNETICS Six Months Ended June 28		
1975	1974	
Shr Ernd	\$ .85	\$ .28
Revenue	11,570,374	11,261,025
Tax Cred	506,726	.....
Earnings	1,072,588	354,747

## COMPUTERWORLD Computer Stocks Trading Indexes

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## Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 13, 1975

All statistics compiled,  
computed and formatted by  
TRADE\*QUOTES, INC.  
Cambridge, Mass. 02139

F X C H	PRICE					F X C H	PRICE					F X C H	PRICE									
	1975	CLOSE	WEEK	WEEK			1975	CLOSE	WEEK	WEEK			1975	CLOSE	WEEK	WEEK						
	RANGE	AUG 13	NET	PCT			RANGE	AUG 13	NET	PCT			RANGE	AUG 13	NET	PCT						
	(1)	1975	CHNGE	CHNGE			(1)	1975	CHNGE	CHNGE			(1)	1975	CHNGE	CHNGE						
COMPUTER SYSTEMS																						
N	BURROUGHS CORP	62-109	91 1/4	0	0.0	N	ADVANCED COMP TECH	1-1	1	0	0.0	N	CONRAC CORP	12-23	17	-1 1/2	-8.1					
N	COMPUTER AUTOMATION	2-10	8 1/8	+1/4	+3.1	N	APPLIED DATA RES.	1-10	1 7/8	-1/4	-11.7	N	DATA ACCESS SYSTEMS	1-3	2 1/4	0	0.0					
N	CONTROL DATA CORP	11-23	16 3/8	-3/4	-4.3	N	AUTOMATIC DATA PRD	29-65	53 1/8	+1/8	+0.2	N	DATA 100	5-16	9 3/8	-3/8	-3.9					
N	DATA GENERAL CORP	10-38	29 1/2	+3/4	+2.6	N	BRANIFF APPLIED SYST	1-1	1 1/4	0	0.0	N	DATA PRODUCTS CORP	2-6	4	0	0.0					
N	DATAPoint CORP	6-26	19	-1/2	-2.5	N	CENTRAL DATA SYSTEMS	3-7	6 1/2	0	0.0	N	DATA TECHNOLOGY	1-3	1 3/4	+1/8	+7.6					
N	DIGITAL CORP	1-4	3 3/4	-1/4	-6.2	N	COMPUTER DIMENSIONS	2-6	4 1/2	0	0.0	N	OPTUM INC	1-2	1 5/8	0	0.0					
N	DIGITAL EQUIPMENT	46-122	111 1/4	+3/4	+0.6	N	COMP ELECTION SYSTEMS	3-6	5 1/2	-1/4	-4.3	N	OFFICE DATA COMP	4-7	4 1/2	-1/4	-5.2					
N	ELECTRONIC ASSOC.	2-3	2 3/4	0	0.0	N	COMPUTER HORIZONS	1-1	3/4	0	0.0	N	OLITA DATA SYSTEMS	1-1	1 1/4	0	0.0					
N	ELECTRONIC ENGINEER.	5-10	9 1/8	+1/4	+2.8	N	COMPUTER NETWORK	1-3	2 3/8	0	0.0	N	OLYMPIC CONTROLS	1-1	1 1/4	-1/4	-16.6					
N	FOXBORO	23-42	32 3/8	-3 1/8	-8.8	N	COMPUTER SCIENCES	2-6	4 1/2	-1/4	-5.2	N	ELECTRONIC M & M	1-3	2 1/8	0	0.0					
N	GENERAL AUTOMATION	6-14	8 5/8	-7/8	-9.2	N	COMPUTER TASK GROUP	1-1	5/8	0	0.0	N	FABRI-TEK	1-1	1 1/2	-1/8	-10.0					
N	GPI COMPUTER CORP	1-1	1 1/2	-1/8	-20.0	N	COMSHARE	3-4	3	+1/8	+4.3	N	GENERAL COMPUTER SYS	1-2	1 1/2	-1/4	-14.2					
N	HEWLETT-PACKARD CO	58-120	104 1/4	+2	+1.9	N	DATATAB	1-2	1 1/2	-1/8	-7.6	N	HAZELTINE CORP	3-6	4 1/8	-1/2	-10.8					
N	HONEYWELL INC	22-40	29	-1	-3.3	N	ELECT COMP PRD	1-1	1 1/4	0	0.0	N	HARPIS CORP	18-28	23 3/8	-3/8	-1.5					
N	IBM	158-224	177 1/2	-8 1/2	-4.5	N	ELECTRONIC DATA SYS.	12-29	18 3/8	+7/8	+5.0	N	INTERCOM CORP	3-12	10 1/4	-1/2	-4.6					
N	MEMPHIS	1-10	7 5/8	-1 1/2	-16.4	N	INFORMATIONAL INC	1-1	1/8	0	0.0	N	INFOTEC INC	2-5	3	0	0.0					
N	MICRODATA CORP	2-6	4 1/4	0	0.0	N	IRS COMPUTER MARKET	1-1	3/4	+1/4	+50.0	N	INFORMATION INTL INC	8-14	12 5/8	-1/4	-1.9					
N	MODULAR COMPUTER SYS	5-19	11 1/2	-2 3/4	-19.2	N	KEANE ASSOCIATES	2-3	2 1/4	0	0.0	N	LINCOLN ELECTRONICS	3-3	2 7/8	0	0.0					
N	NCP	15-39	28 1/4	-5/8	-2.1	N	KEYDATA CORP	2-3	2 5/8	0	0.0	N	MANAGEMENT ASSIST	1-1	5/8	+1/8	+25.0					
N	PRIME COMPUTER INC	2-6	5 1/2	-1/4	-4.3	N	LOGICON	3-5	3 5/8	-1/8	-3.3	N	MILGO ELECTRONICS	8-24	16 5/8	-1 3/8	-7.6					
N	REPIN-ELMER	16-30	24	-7/8	-3.5	N	MANAGEMENT DATA	1-3	2	-1/8	-5.8	N	MILHAWK DATA SCI	1-5	2 1/2	-1/2	-16.6					
N	RAYTHEON CO	26-59	46 1/2	-3/4	-1.5	N	NATIONAL CSS INC	6-14	10 1/2	+1 1/4	+13.5	N	ORITICAL SCANNING	1-3	3	0	0.0					
N	SINGER COMPANY	10-17	12 1/2	-1/8	-0.9	N	NATIONAL COMPUTER CO	1-1	1 1/8	0	0.0	N	RENIL CORP	2-2	1 3/4	0	0.0					
N	SREPPY PANO	26-49	41 1/4	+1/2	+1.2	N	ON LINE SYSTEMS INC	8-17	13 5/8	+3/8	+2.8	N	REPTEC CORP	2-8	6	+1/8	+2.1					
N	SYSTEMS ENG. LABS	1-5	3	0	0.0	N	PLANNING RESEARCH	2-6	3 5/8	-1/8	-3.3	N	ROTTER INSTPMENT	2-2	1 3/4	0	0.0					
N	ULTIMAC SYSTEMS INC	1-6	5 3/8	-5/8	-10.4	N	PROGRAMMING & SYS	1-1	5/8	0	0.0	N	RPRECISION INST.	1-1	3/4	-1/4	-25.0					
N	VARIAN ASSOCIATES	7-18	13 3/8	-1/4	-1.8	N	RASINATA INC	2-5	3 5/8	-1/8	-3.3	N	QUANTOR CORP	2-6	4 1/2	-1/4	-5.2					
N	WING LARS	7-17	11 3/4	0	0.0	N	REYNOLDS & REYNOLDS	11-24	12	-1 1/2	-11.1	N	RECOGNITION EQUIP	2-9	6 1/4	-1/2	-7.4					
N	XEPH CORP	51-86	54 5/8	-5	-8.3	N	SCIENTIFIC COMPUTER	1-1	1	0	0.0	N	SANDOPS ASSOCIATES	3-11	7 1/8	-1/2	-6.5					
LEASING COMPANIES																						
N	COMMERCE GROUP CORP	2-4	2 7/8	-1/8	-4.1	N	SIMPLICITY COMPUTER	1-1	3/4	+1/8	+20.0	N	SCAN DATA	1-3	2	0	0.0					
N	COMPUTER INVESTS GRP	1-2	7/8	0	0.0	N	TMSHARE INC	7-21	17 3/8	+1 1/8	+6.9	N	STORAGE TECHNOLOGY	6-17	12	-1	-7.6					
N	DATAPoint CORP	1-1	1 1/2	0	0.0	N	URS SYSTEMS	2-4	3 1/8	+1/8	+4.1	N	SYCCP INC	5-15	11 1/2	-1	-8.0					
N	DCL INC	1-1	1/2	0	0.0	N	WYLY CORP	2-4	3 1/4	-3/8	-10.3	N	T BAR INC	3-6	5 3/8	-1/8	-2.2					
N	DPE INC	3-6	4 7/8	+1/4	+5.4	PERIPHERALS & SUBSYSTEMS											N	TALLY CORP.	1-5	3 1/4	-1/8	-3.7
N	EDR RESOURCES	1-2	1	0	0.0	N	ADDRESSOGRAPH-MULT	4-9	6 1/4	+1/8	+2.0	N	TEC INC	1-4	3 1/2	0	0.0					
N	GRANITE MGT	1-5	3 1/8	-5/8	-16.6	N	ADVANCED MEMORY SYS	1-7	5	-3/8	-6.9	N	TEKTRONIX INC	18-41	35 3/4	+1 3/4	+5.1					
N	GREYHOUND COMPUTER	2-3	3	0	0.0	N	AMREX CORP	3-7	5 3/8	-1/4	-4.4	N	TELEX	1-3	2 1/4	-1/4	-10.0					
N	ITEL	3-9	6 3/4	+1/8	+1.8	N	ANDERSON JACOBSON	1-3	2 3/8	-1/8	-5.0	N	WANGCO INC	4-9	6 3/8	0	0.0					
N	LEASCO CORP	4-8	6 5/8	-1 1/8	-14.5	N	BEEHIVE MEDICAL ELEC	1-5	3 5/8	-1/8	-3.3	N	WILTEK INC	1-4	2 1/2	0	0.0					
N	LFASRAC CORP	1-1	1/4	0	0.0	N	BOLT, BRANCK & N-W	5-13	9 5/8	+1/4	+2.6	SUPPLIES & ACCESSORIES										
N	LECTRO MGT INC	1-1	1/8	0	0.0	N	BUNKEP-RAND	4-7	4 3/4	-1/8	-2.4	N	BAITIMORE BUS FORMS	4-5	4 1/2	0	0.0					
N	NRG INC	1-4	2 7/8	0	0.0	N	CALCOMP	4-7	4 3/4	-3/8	-7.3	N	BARRY WRIGHT	5-7	6 5/8	+1/8	+1.9					
N	RIODEFF TEX CORP	2-7	5 1/4	0	0.0	N	CAMBRIDGE MEMORIES	3-5	3 7/8	-1/8	-3.1	N	CYPERMATIC'S INC	1-1	1 1/2	0	0.0					
N	ROCKWOOD COMPUTER	1-1	5/8	0	0.0	N	CENTRONICS DATA CORP	7-25	17	-1/4	-1.4	N	DATA DOCUMENTS	29-42	33 7/8	-5/8	-1.8					
N	U.S. LEASING	9-14	10 1/8	+3/8	+3.8	N	CODEX CORP	15-38	31 3/4	-1/2	-1.5	N	DUPLEX PRODUCTS INC	12-25	17 1/8	-1	-5.5					
SOFTWARE & EDP SERVICES																						
N	ADVANCED COMP TECH	1-1	1	0	0.0	N	COGNITRONICS	1-2	1 1/8	-1/4	-1.8	N	ENNIS BUS. FORMS	5-7	5 1/8	-1/2	-8.5					
N	APPLIED DATA RES.	1-10	1 7/8	-1/4	-11.7	N	COMPUTER COMMUN.	1-2	1 1/8	-1/8	-10.0	N	GRAHAM MAGNETICS	5-10	7 3/4	-1/2	-6.0					
N	AUTOMATIC DATA PRD	29-65	53 1/8	+1/8	+0.2	N	COMPUTER CONSOLES	3-7	5 3/4	+1/4	+4.5	N	GRAPHIC CONTROLS	8-21	10 1/4	-1 7/8	-15.4					
N	BRANIFF APPLIED SYST	1-1	1 1/4	0	0.0	N	COMPUTER EQUIPMENT	1-2	1 1/2	-1/4	-14.2	N	IBM COMPANY	43-68	54 5/8	-1 7/8	-3.3					
N	CENTRAL DATA SYSTEMS	3-7	6 1/2	0	0.0	N	COMPUTER MACHINERY	1-2	1 1/2	-1/8	-7.6	N	IMMORP CORP LTD	19-51	44 1/2	-1 3/4	-3.7					
N	COMPUTER DIMENSIONS	2-6	4 1/2	0	0.0	N	COMPUTER TRANSCIVER	1-2	1 1/4	+1/8	+11.1	N	NASHUA CORP	13-22	12 7/8	-1	-7.2					
N	COMP ELECTION SYSTEMS	3-6	5 1/2	-1/4	-4.3	SUPPLIES & ACCESSORIES											N	STANDARD REGISTER	11-20	15 3/4	-3/4	-4.5
N	COMPUTER HORIZONS	1-1	3/4	0	0.0	N	ADDRESSOGRAPH-MULT	4-9	6 1/4	+1/8	+2.0	N	TAB RECORDERS CO	4-8	5 3/4	0	0.0					
N	COMPUTER NETWORK	1-3	2 3/8	0	0.0	N	ADVANCED MEMORY SYS	1-7	5	-3/8	-6.9	N	UACOR	17-24	20 1/2	-1	-4.6					
N	COMPUTER SCIENCES	2-6	4 1/2	-1/4	-5.2	N	AMREX CORP	3-7	5 3/8	-1/4	-4.4	N	VANIER GRAPHICS CORP	4-7	4 1/2	-1/4	-5.2					
N	COMPUTER TASK GROUP	1-1	5/8	0	0.0	N	ANDERSON JACOBSON	1-3	2 3/8	-1/8	-5.0	N	WASH MAGNETICS	3-5	4	-1/8	-3.0					
N	COMSHARE	3-4	3	+1/8	+4.3	N	BEEHIVE MEDICAL ELEC	1-5	3 5/8	-1/8	-3.3	N	WALLACE BUS FORMS	15-25	18 3/4	-1/2	-2.5					
N	DATATAB	1-2	1 1/2	-1/8	-7.6	N	BOLT, BRANCK & N-W	5-13	9 5/8	+1/4	+2.6											
N	ELECT COMP PRD	1-1	1 1/4	0	0.0	N	BUNKEP-RAND	4-7	4 3/4	-1/8	-2.4											
N	ELECTRONIC DATA SYS.	12-29	18 3/8	+7/8	+5.0	N	CALCOMP	4-7	4 3/4	-3/8	-7.3											
N	INFORMATIONAL INC	1-1	1/8	0	0.0	N	CAMBRIDGE MEMORIES	3-5	3 7/8	-1/8	-3.1											
N	IRS COMPUTER MARKET	1-1	3/4	+1/4	+50.0	N	CENTRONICS DATA CORP	7-25	17	-1/4	-1.4											
N	KEANE ASSOCIATES	2-3	2 1/4	0	0.0	N	CODEX CORP	15-38	31 3/4	-1/2	-1.5											
N	KEYDATA CORP	2-3	2 5/8	0	0.0	N	COGNITRONICS	1-2	1 1/8	-1/4	-1.8											
N	LOGICON	3-5	3 5/8	-1/8	-3.3	N	COMPUTER COMMUN.	1-2	1 1/8	-1/8	-10.0											
N	MANAGEMENT DATA	1-3	2	-1/8	-5.8	N	COMPUTER CONSOLES	3-7	5 3/4	+1/4	+4.5											
N	NATIONAL CSS INC	6-14	10 1/2	+1 1/4	+13.5	N	COMPUTER EQUIPMENT	1-2	1 1/2	-1/4	-14.2											
N	NATIONAL COMPUTER CO	1-1	1 1/8	0	0.0	N	COMPUTER MACHINERY	1-2	1 1/2	-1/8	-7.6											
N	ON LINE SYSTEMS INC	8-17	13 5/8	+3/8	+2.8	N	COMPUTER TRANSCIVER	1-2	1 1/4	+1/8	+11.1											
N	PLANNING RESEARCH	2-6	3 5/8	-1/8	-3.3	N	COMTEN	2-5	3 7/8	0	0.0											
N	PROGRAMMING & SYS	1-1	5/8	0	0.0												N	CONRAC CORP	12-23	17	-1 1/2	-8.1
N	RASINATA INC	2-5	3 5/8	-1/8	-3.3												N	DATA ACCESS SYSTEMS	1-3	2 1/4	0	0.0
N	REYNOLDS & REYNOLDS	11-24	12	-1 1/2	-11.1												N	DATA 100	5-16	9 3/8	-3/8	-3.9
N	SCIENTIFIC COMPUTER	1-1	1	0	0.0												N	DATA PRODUCTS CORP	2-6	4	0	0.0
N	SIMPLICITY COMPUTER	1-1	3/4	+1/8	+20.0												N	DATA TECHNOLOGY	1-3	1 3/4	+1/8	+7.6
N	TMSHARE INC	7-21	17 3/8	+1 1/8	+6.9												N	OPTUM INC	1-2	1 5/8	0	0.0
N	URS SYSTEMS	2-4	3 1/8	+1/8	+4.1												N	OFFICE DATA COMP	4-7	4 1/2	-1/4	-5.2
N	WYLY CORP	2-4	3 1/4	-3/8	-10.3												N	OLITA DATA SYSTEMS	1-1	1 1/4	0	0.0
PERIPHERALS & SUBSYSTEMS																						
N	ADDRESSOGRAPH-MULT	4-9	6 1/4	+1/8	+2.0	N	ADVANCED COMP TECH	1-1	1	0	0.0	N	OLYMPIC CONTROLS	1-1	1 1/4	-1/4	-16.6					
N	ADVANCED MEMORY SYS	1-7	5	-3/8	-6.9	N	APPLIED DATA RES.	1-10	1 7/8	-1/4	-11.7	N	ELECTRONIC M & M	1-3	2 1/8	0	0.0					
N	AMREX CORP	3-7	5 3/8	-1/4	-4.4	N	AUTOMATIC DATA PRD	29-65	53 1/8	+1/8	+0.2	N	FABRI-TEK	1-1	1 1/2	-1/8	-10.0					
N	ANDERSON JACOBSON	1-3	2 3/8	-1/8	-5.0	N	BRANIFF APPLIED SYST	1-1	1 1/4	0	0.0	N	GENERAL COMPUTER SYS	1-2	1 1/2	-1/4	-14.2					
N	BEEHIVE MEDICAL ELEC	1-5	3 5/8	-1/8	-3.3	N	CENTRAL DATA SYSTEMS	3-7	6 1/2	0	0.0	N	HAZELTINE CORP	3-6	4 1/8	-1/2	-10.8					
N	BOLT, BRANCK & N-W	5-13	9 5/8	+1/4	+2.6	N	COMPUTER DIMENSIONS	2-6	4 1/2	0	0.0	N	HARPIS CORP	18-28	23 3/8	-3/8	-1.5					
N	BUNKEP-RAND	4-7	4 3/4	-1/8	-2.4	N	COMP ELECTION SYSTEMS	3-6	5 1/2	-1/4	-4.3	N	INTERCOM CORP	3-12	10 1/4	-1/2	-4.6					
N	CALCOMP	4-7	4 3/4	-3/8	-7.3	N	COMPUTER HORIZONS	1-1	3/4	0	0.0	N	INFOTEC INC	2-5	3	0	0.0					
N	CAMBRIDGE MEMORIES	3-5	3 7/8	-1/8																		



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